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THE
SMALL FRUIT CULTURIST.

BY
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NEW, REWRITTEN, AND ENLARGED EDITION.

BEAUTIFULLY ILLUSTRATED.



NEW YORK:
ORANGE JUDD COMPANY,
751 BROADWAY.
1885.

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11AT2.A9 3HT

303.1100

E634.7

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PREFACE TO REVISED EDITION.

It is now fourteen years since I wrote the first edition of this work, and sent it forth upon its mission. At that time no one, however sanguine as to the success of Small Fruit Culture in this country, could have imagined that so great progress would have been made within the time named. From a few small plantations, scattered about the country here and there, the cultivation of these fruits has extended until the numbers of specialists in this branch of horticulture amounts to thousands, and we may safely say that the quantity of berries now sent to some of our larger cities in a single day, is greater than the entire amount sent in a whole season fifteen years ago. That this little work has had some influence in promoting this advance in small fruit culture, the author thinks he may claim without fear of being accused of conceit. The large number of copies sold by the publishers has not only been very gratifying to the author, but it has shown that there was a want of just such information as it contained. The people of Germany have long been considered among the best informed and most practical fruit growers in the world; but they appear to have discovered something in this work worthy of their attention, for, in 1868, Mr. Heinrich Maurer, of

Jena, translated in into German, and a very handsome edition was brought out by Bernhard Friedrich Voight, of Weimar. This being the first horticultural book written by an American which has been translated and published in Germany, I cannot but feel that it is not only a compliment to the author, but to American horticulturists generally.

My principal object in experimenting with Small Fruits, and giving the results to the public in a book, was to make these fruits more plentiful than formerly, and, if possible, to encourage their cultivation until they should be produced in such abundance that even the poor of our cities might be able to obtain what had been long considered as luxuries for the rich only. Whether I have been instrumental in producing these results, it is not for me to say, but our markets are now well supplied with choice small fruits of all kinds, and usually in such abundance that high prices can no longer debar even the poor from indulging in an occasional dish of the best. That the same abundance may be continued is the wish of

THE AUTHOR.

Ridgewood, N. J., July, 1881.

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INTRODUCTION.

The cultivation of the Small Fruits, as a distinct feature in horticulture, commenced less than twenty-five years ago. It is true we had raspberries, strawberries, currants, and other berries in our gardens, and nurserymen propagated the plants for sale to a very limited extent, but a catalogue made up exclusively of the Small Fruits was unknown, and I may add, the common announcement in catalogues of to-day, "Small Fruits a Specialty," has come into use within the past twenty years. In Europe there were a few men who made a specialty of the Small Fruits, some choosing the Gooseberry, others the Strawberry, and cultivating these on a limited scale, but to take the entire group of Small Fruits, and make these the prominent feature, or specialty, was as rare in the old world as in the new. The further we go back into the history of horticulture, the less do we find in regard to the berries, and even two centuries ago scarcely any of the English and French authors give anything more than a passing notice of some wild berries, which were occasionally transplanted into the garden. The family supply of these fruits was drawn from the fields and woods, and while the apple, pear, plum, and other larger fruits were attracting attention, as they had done from the earliest times, the Small Fruits remained in their natural and undeveloped state.

Early in the present century, some attempts were made in England to improve the Strawberry, and these being quite successful, a new interest was awakened in this fruit among the horticulturists of the old world, but no

great progress was made in the cultivation of the different kinds of Small Fruits until several years later.

The progress of fruit-culture in the United States is probably more apparent than in other countries, for we have only to go back to a period within the memory of horticulturists still living, to ascertain nearly every fact in regard to its history. Ask any of our older horticulturists concerning the markets of forty years ago, and they will tell us that there were no Hovey or Wilson Strawberries offered for sale in those days ; no Cherry or White Grape Currants ; no New Rochelle or Kittatinny Blackberries ; but that they were wholly supplied with berries from the woods and uncultivated fields.

The progress we have made in Small Fruit Culture during the past twenty years is certainly something of which our horticulturists may well feel proud, but the limits in the way of advancement have not as yet been reached, and there is room enough for those who may wish to enter this field to work out many an unsolved problem.

The cause of our advancement is, in a great measure, due to the dissemination of information upon the subject through the horticultural and agricultural press. It is by reading these that the masses have learned where to obtain the plants they desire and how to cultivate them. Thus, by having a medium through which both parties are benefited, trade is augmented and progress made more certain.

The originators of new varieties have been stimulated to make great exertions, because of the high prices paid for their products in times past, but it is quite probable that new sorts will not hereafter command so much attention as they have in years gone by, at least it will not be so easy to obtain high prices for a second-rate article. What may be termed the "Small Fruit Craze" has had its day, and hereafter it will be only the really valuable sorts—the intrinsic worth of which has become fully

ascertained and established, that will be in demand. There has been altogether too much puffing of new or supposed to be new sorts, before their merits or identity had become fully ascertained. In many instances varieties have been announced as something wonderful, and endorsed by scores of ministers, doctors, lawyers, and other prominent gentlemen—neighbors of the originators, not one of whom perhaps ever had any experience in fruit-culture, or could tell a “Wilson” Strawberry from a “Hovey” or a “Chas. Downing.” Instances of this kind of worthless endorsement of new or old sorts, are becoming more and more frequent and annoying to the horticulturist and the public at large. The old “Belle de Fontenay” Raspberry was recently brought out as something new under the name of Amazon, and the man who claimed to have produced it, procured the endorsement of some half a score of ministers as to his own honesty, and the great and valuable merits of his bantling. The said ministers may be very good men, and know something of their parishioner’s character, and still, as proved in this case, know very little about Raspberries. In other instances the Mayor of a city, or some noted politician, is called upon to endorse the statement of the raiser of a new variety, while there are plenty of good horticulturists near at hand, whose word in such cases would carry some weight among fruit-growers generally. All persons interested in fruit growing should unite in condemning this species of quackery in horticulture.

The facilities for disseminating plants of all kinds, have largely increased during the past few years, our railroads having penetrated almost every part of the country, from the Atlantic to the Pacific, affording safe and rapid facilities for transmission of plants to the most distant localities. Added to this, the Post-office Department permits the sending of plants through the mails, but I regret to say at rates of postage far in excess of what they should

be in a country where agriculture and horticulture are the foundation of national wealth. The rates of postage on seeds, plants, and cuttings, has been doubled since the first edition of this book was published, while the rates on some other classes of matter have been reduced to an almost nominal sum—a discrimination against agriculture and horticulture not warranted by the needs of the Department, and much against the wishes of the public at large. The increase of railroad facilities and other means of transportation has not been to the advantage of fruit-growers in all localities alike, but to some a great disadvantage, as it has brought distant parts of the country into close competition. The fruit-growers in the Southern States can now send their berries to northern markets, and while these do not come into direct competition with those grown in the North, still their presence has a very depressing influence upon prices. Weeks and sometimes months before the northern berries are ripe, the markets are flooded with the southern grown fruit, and the residents of our cities have had enough of strawberries before the home-grown berries come in, and wanting a change the public seek some other kind to the neglect of the fresh berries from the fields in the suburbs, and prices go down accordingly. The southern fruits bring high prices, but the cost of freight, commission, etc., leave the raiser but a small margin for profit; consequently the only parties benefited are the transportation companies, commission men, and the consumer.

There have been no great discoveries or improvements made in methods of culture or propagation of the Small Fruits during the past dozen years, but there appears to be a growing desire to improve native varieties to the exclusion or neglect of the foreign, and this is especially noticeable among the cultivators of the Raspberry. The native sorts are attracting most attention, and are well deserving of it, because the foreign ones here have never

been satisfactory in general cultivation. There is room for great improvements upon even the best of those now known as the leading native varieties, and if half the time and skill had been bestowed upon the native Red Raspberry, in endeavoring to produce new sorts, as has been upon the foreign, we would now have something better than even the highly extolled Cuthbert and Turner.

The introduction and almost general use of fruit-preserving cans have afforded the people an opportunity of obtaining an uninterrupted supply of choice fruits, regardless of time or season. Thousands of bushels are annually preserved for home use by families, both in country and city. One may step into any of our restaurants—even when the snow covers the fields and with the thermometer at zero—and call for a dish of strawberries and cream, and he will be supplied as readily as in the month of June. The fruit may not be quite so good as when first gathered from the plant, but, considering the time of year, it is very acceptable. Not only do private families, saloons, and hotels consume enormous quantities of the Small Fruits which have been preserved in these hermetically sealed cans and jars, but every steamer or sailing vessel that leaves our ports takes with it a supply for use on the voyage, and it often forms a share of the freight. We are not only called upon to produce fruits to supply the home demand, but other portions of the world which cannot or do not produce them, and it can readily be seen that it must be many years before anything like an adequate quantity can be produced, even with the rapid strides we are making. The field for production may appear to be a very large one, still it is far less than that of consumption. It is not every location or soil that is adapted to the cultivation of the Small Fruits, neither will every variety succeed equally well on the same place. Consequently the favorable regions for particular kinds must furnish the people of other loca-

tions ; thus an exchange is made beneficial to both, and to the advantage of trade. The Southern States produce fruit for home consumption, and for sale at the North, and *vice versa*. Different sections produce different fruits, but often both yield the same, and yet they become a market for each other.

With a constantly increasing demand, and no apparent prospect of our markets being fully supplied, it is no wonder that many have turned their attention to the cultivation of the Small Fruits.

All along the lines of our railroads, canals, and navigable rivers, new villages are springing up, each of which soon becomes a shipping point for produce sent to the larger cities and villages. Places which did not exist eight or ten years ago, are now annually sending to market a half million to a million baskets of fruits.

It is not to be expected that every one who attempts the cultivation of the Small Fruits will be successful, any more than that all will succeed in any other business, still it must be admitted, that the culture of the leading varieties of this class offers as wide and safe a field for enterprise as is to be found in any other branch of business pertaining to the cultivation of the soil.

Some will fail because they obtained varieties unsuited to their soil or location, for it must be remembered that there is no such thing as general cultivation, when applied to the whole United States. Others will attempt more than they are capable of completing. And there are those who imagine that all that is required is, to obtain the plants and see that they are planted, after which they can sit down and wait for a bountiful harvest. Such people are always disappointed, and it matters not what they undertake they are sure to be unfortunate, and every experiment will end in failure until they learn to labor as well as to wait. Profitable fruit-culture cannot result from idleness or negligence. Prompt, energetic action, ap-

plied at the proper time, is far more essential with the small fruits than with the larger ones. An apple or pear tree will struggle long, and often successfully, against weeds, drouth, or an unsuitable soil, while a Raspberry or Strawberry plant would perish in a week under similar circumstances. There is probably nothing appertaining to the cultivation of the soil which will, if properly conducted, yield more pleasure or profit than the culture of our best varieties of small fruits. Still it must not be expected that there are no difficulties in the way, for there will sometimes be early and late frosts; wet and dry seasons; cold winters and hot summers, and insects that will destroy more rapidly than nature can restore; therefore no one should attempt the culture of any kind of fruit, unless he has courage and perseverance sufficient to meet and overcome all the obstacles he may find in the road to success. To the inexperienced cultivator these difficulties may appear very formidable, yet they are no greater than in any other branch of business, and far less than in many. The small fruits, as a class, are less liable to be affected by disease or insects than a majority of the larger kinds, and as many of them, like the Raspberry and Blackberry, bloom late in the season and perfect their fruit early, they are seldom injured by the late spring frosts, which are often so very destructive to the Peach, Apple, and other early bloomers.

To guard against great losses it is best not to risk one's entire capital in any one kind, for if that should fail, it would be ruinous. Neither is it advisable to cultivate too great a variety, for capital, needlessly scattered, is not readily gathered. The aim of the cultivator should be: 1st—To provide against total failure. 2d—Cultivate no more of any one kind than he can properly attend to, both in cultivating and in gathering the fruit. 3d—Provide for a succession of crops, so that there shall be an uninterrupted income, in preference to a large and fluctuating

one. Fruit-baskets, crates, etc., must be provided, and the capital invested in these should not be allowed to remain idle any longer than is absolutely necessary. If several kinds are cultivated, commencing with the Strawberry, and followed by Raspberries, Gooseberries, Currants, and Blackberries, the fruit-baskets may be constantly employed for at least three months, when if but one kind is grown their use will scarcely extend over as many weeks. Besides this, a better class of help can be secured for gathering the fruit where steady employment for three months can be given, than when for only a few days or weeks.

The chief object of those who cultivate fruit for market is that of profit, and to secure the largest return on capital invested requires a judicious selection of varieties. The best in quality are seldom the most profitable for general market purposes. Usually the highest flavored are the most delicate growers and quite unproductive. Individual tastes differ—one will choose a variety that another will reject. Taste, however, is changeable, and a fruit, which at one time may be quite distasteful, will, by a constant acquaintance, become very agreeable. Our markets are but an aggregation of individuals, consequently they often change, and a particular variety of fruit, when first introduced, will find no purchasers, though it may afterwards become exceedingly popular.

A particular color will often be the cause of rejection, and it will require a constant and persistent effort on the part of the producer to introduce the variety and persuade the masses to purchase. A case in point is that of the Brinckle's Orange Raspberry, a variety which is acknowledged, by connoisseurs in fruit, to be one of the very best in quality; still, place it beside almost any ordinary red variety in any of the New York markets, and not ten baskets of it will be sold to one hundred of the latter.

In other cities the results may be quite the reverse.

which would only show that the masses must become acquainted with a variety before they will freely purchase, especially if it differs widely in appearance from those which are well known. The public taste in this country has not as yet been sufficiently cultivated to discriminate or select the very best, and it is doubtful if the masses appreciate or care whether a fruit is fully up to any particular standard of quality that scientific horticulturists have endeavored to establish; quantity is evidently more highly prized than quality, especially if the latter is attended by scarcity.

I do not wish in these remarks to convey the idea that the very best should not always be sought for, but when their cultivation is not remunerative, quality alone becomes of doubtful advantage to the producer.

The more familiar a people become with any particular kind of fruit, the more they will appreciate it, and should anything occur to deprive them of a supply, they will feel the loss very keenly. Small fruit-culture has already become quite a prominent feature in American horticulture, and every possible means should be employed, not only to keep up the supply, but to increase it, so that it shall equal the demand.

Heretofore its production has been mainly local; that is, a particular neighborhood has made a specialty of growing some one or more kinds that have been found to be adapted to the location and soil.

Fruit-growers in other sections, having tried the same variety or varieties, as the case may be, and not finding their culture remunerative, have discarded them. Instead of doing this, they should have tried to produce new varieties that would succeed; or, endeavored to procure from among the many already known, some kind that was adapted to their particular soil and location. It is well known to every experienced horticulturist that certain species, and all the varieties produced therefrom, fail in

some locations and soils, while other species and their varieties, although of the same genus, will succeed most admirably. These peculiarities of species have given rise to much discussion among fruit-growers. One will assert, for instance, that the Raspberry is a total failure in his section, and that it cannot be grown, which may be true in regard to a particular kind or class, but no farther. There is probably no soil in our whole country, unless it be under water or totally barren, in which some one or more kinds of small fruits may not be profitably grown. The great desideratum is, to determine which they are, and the people are looking to experimenters to furnish the required information.

This is being given through various mediums that are accessible to all, and the rapidly extending culture of this class of fruits shows very clearly that the knowledge gained is put to practical use. The dissemination of simple facts, which are frequently conveyed in a single word or line, is often of more value than a learned and elaborate essay.

We sometimes observe in nurserymen's catalogues, referring to a particular variety, a simple remark like this: "succeeds admirably with me in a light sandy, clayey, or loamy soil," as the case may be, thereby giving a key to the secret of his success and the failure of others.

There was a time in the history of horticulture when secrets were a merchantable commodity, and the particular methods of propagation and culture were transferred from one gardener to another for a consideration. But those days are past, for the true horticulturist of the present day keeps no secrets that will benefit mankind, but hastens to give to the world the advantages which may arise from any discovery he makes, receiving in return that which is of more lasting value than money: the thanks of his co-laborers. It is true, that occasionally a man can be found so blind to his own interest and reputation, and

so selfishly mean, as to desire to keep to himself any process by which he thinks he can surpass his neighbors, and tax the public for his own benefit; but such is the estimation in which these men are held by a large majority of horticulturists, and so readily is their meanness discovered by their customers, that they are very soon obliged either to retire from business and seek some other less honorable occupation, or eke out a miserable existence supported by the patronage of a class no better than themselves.

The laws of nature should be secrets to none, and he who would deny others the knowledge of any important discovery in horticultural processes, would, if he were able, have the blessed sunshine and showers shut out from every field but his. It is to the constant interchange of facts, derived from experience, that we owe much of our progress in horticulture. To know the different varieties, so that one can name them at sight, does not constitute, as some may suppose, all the knowledge requisite to enable one to cultivate them successfully.

Their adaptation to the various soils, locations, and climate; the best mode of cultivation, propagation, pruning; whether the fruit is firm or fragile, rendering it more suitable for market or home use—these and many other points must be understood before one can safely go into small fruit-culture on an extensive scale. There has been much discussion as to whether a constant cultivation of the soil was necessary to produce remunerative results from growing the apple, peach, pear, and kindred fruits. There is, perhaps, some reason in particular cases for an apparent neglect, such as excessive growth, which may be checked by non-cultivation more readily than otherwise. But with the fruits, of which we shall treat in the following pages, there are no exceptions to the rule—the better the care, the more remunerative the results. By bestowing the best of care, we will not only obtain better returns, but they will be in an increased ratio to the amount

of labor bestowed. In many instances, with an annual expenditure of twenty-five dollars per acre, a return of only one hundred is obtained, while upon the same soil and with the same variety, if fifty dollars had been expended, the return would have been three or four hundred. All experiments show that *extra culture* is far more profitable than what is generally termed *good culture*. I do not mean by this that it is necessary to trench the soil four feet deep, and apply a thousand loads of manure per acre to a soil which is naturally deep and rich; but that deep plowing and subsoiling should be employed, with a liberal supply of enriching materials, if the best results are to be obtained. But few of those who are called good cultivators are aware of the large increase of fruit which may be produced on an acre by giving extra culture, instead of the ordinary method. Many fruit-growers, for the purpose of extending their business, increase the number of acres, when, if they would double the depth of that which they already possess, they would obtain the same increase in product without going to the expense of purchasing more land, besides incurring the extra trouble of cultivating two acres, when one might, with proper care, produce the same results. Deepening the soil is not wholly for the purpose of furnishing more plant food, nor to facilitate the downward growth of roots, but it is principally for the purpose of disintegration, and making it of such a consistency that it will be capable of retaining a sufficient amount of moisture at all times to nourish and supply the plants growing therein, but not enough to be detrimental. Rain water, as is well known, contains gases that are beneficial to plants, and if the soil is in a condition to allow it to pass through it, a large portion of these gases will be retained, but if the surface is hard, the water either runs off or remains until it evaporates.

Again, a soil that is loose and friable admits air, and

with it moisture. To prove this fact, we have only to take a piece of glass or polished steel, or any similar substance, and place it in an ice-house where it will become cold; then carry it into the open air, and in a moment it will be covered with water condensed from the atmosphere. Now, we know that this moisture did not exude from the glass, therefore it must have come from the air. By stirring the soil, and placing that which has become heated underneath to warm the roots, and bringing the cooler portions to the top to condense the moisture, two objects are obtained: besides loosening the earth that it may be the more easily penetrated by the rootlets, it at the same time admits the air charged with moisture for their nourishment. The benefit derived from frequent stirring of the surface soil in dry weather, especially if it be of a compact nature, is mainly derived from the admission of air containing moisture. Many cultivators appear to think that all that is required of them is, to keep the weeds from growing among their plants, and they never stir the soil except for this purpose; but our best cultivators have learned that frequent moving of the soil is very beneficial to all crops, especially in time of drouth. If any one doubts that soil can be made moist by frequent stirring, let them select a piece of ground under some open shed where no rain has reached for a year or more, break up the soil and pulverize it finely; then stir it and turn it over every morning for a week or two, and it will become quite moist, while a similar soil in the open field, which has not been stirred, will be parched and dry. Mulching the surface with straw, leaves, or similar materials, is often very beneficial, especially to plants whose roots do not penetrate deeply. The mulch not only assists in preventing evaporation, but insures condensation of moisture from the air, which passes freely through it to the soil.

It is not my purpose to enter into any elaborate discus-

sions of particular theories relative to growth, structure, food of plants, or any of the various points in vegetable physiology which are considered debatable questions. But as I shall have occasion in the following pages to advise deep and thoroughly pulverized soil, I have stated the foregoing simple facts, so that the reader may understand why they are recommended.

CHAPTER I.

BARBERRY.—BERBERIS.

NATURAL FAMILY *Berberidaceæ*.

[Name derived from the Arabic *Berberys*. The French name is *Epine vinette*; German, *Berberitze*; Dutch, *Berberisse*; Italian, *Berbero*; Spanish, *Berberis*.]

GENERAL CHARACTERS.—Shrubs of medium size, with yellow inner bark and wood; flowers in drooping racemes; leaves, and fruit, acid. A section of this genus, with evergreen leaves, is called *Mahonia*.

SPECIES.

***Berberis vulgaris*.**—Common Barberry.—Native of Britain, but has become naturalized in the New England States; stems with sharp spines; leaves obovate-oblong, bristly-toothed; berries oblong, scarlet.

***Berberis Canadensis*.**—American Barberry.—Very similar to the last; the racemes not quite so long. Berries oval, red. Considered by some botanists as only a variety of *B. vulgaris*. Alleghanies and southward.

The past summer, in a visit to New Mexico, I found this species in great abundance in the deep canyons, at an elevation of six thousand to eight thousand feet above the sea. It seemed to thrive best along the dry banks and sides of the canyons, among the yuccas and cactuses, where few other plants can survive the long drouths of those regions. Leaves smaller than in *B. vulgaris*, slightly serrate; lighter green; similar in habit, but less robust, perhaps owing to the rigorous climate.

***Berberis Fremonti*.**—Fremont's Barberry.—A handsome large evergreen shrub, five to ten feet high, with rigid trifoliate leaves; leaflets one to two and a half inches long, the middle one usually the longest, somewhat cordate at the base, and with more numerous teeth, the lowest pairs situated close at the base. Flowers in clusters of two or three; berries ovate, dark blue, about the size of small currants. Discovered by Fremont, in

- 1844, in Southern Utah, but it extends along the valleys southward, and would probably succeed in the Middle States, if not in the Northern.

Berberis trifoliata.—Three-leaved Barberry.—Closely allied to the last; common in Western Texas and New Mexico. Berries bright red, and less acid than those of the common barberry. Fruit used for tarts, etc.

Berberis dulcis.—Magellan Sweet Barberry.—Also *B. buxifolia* and *B. rotundifolia*. Straits of Magellan; it is an evergreen there and in England; here it usually drops its leaves late in winter. The berries are round, black, moderately sweet.

Berberis aristata.—Nepaul Barberry.—*B. Asiatica* and *B. Chitra*. A native of various portions of India. Evergreen, with purple fruit, covered with bloom.

The other evergreen species of the Rocky Mountains and the Pacific Coast, *i. e.*, *B. repens*, *B. Aquifolium*, *B. pinnata* and *B. nervosa*, are known as “Mountain” or “Bush-Grapes.” They were formerly placed in the genus *Mahonia*; and are principally cultivated for ornament; the pioneers in the regions named considered the berries as edible, and as a substitute for grapes.

HISTORY:

There is very little in the history of the Barberry that is of interest at the present day. Gerarde, an English author (1597), says that its young leaves were used as a salad in his time.

PROPAGATION.

BY SEEDS.—Gather the fully ripe berries, and put into boxes until the pulp becomes soft, then wash out the seeds, and either sow or keep in sand until wanted.

Sow in the fall; if delayed until spring, the seeds become dry, and more or less of them will not grow. Where the weather is very hot and dry in summer, select a half-shady place for the seed-bed, else the young plants will

be burned off. Sow in drills, and cover them about one inch deep ; keep the weeds down, and stir the soil often.

Transplant in early spring when one or two years old, and at the time of removal shorten the tap-root about one-third.

BY SUCKERS.—The Barberry throws up numerous suckers, chiefly from the main stem, and roots are produced on the base of these, which may be separated from the old plant to increase the number of plants.

BY CUTTINGS.—Cuttings of the ripe wood do not grow as readily as with some other plants ; still, with care, they will succeed. Select one or two-year-old wood in the fall, before it has been severely frozen, and cut it into lengths of six or eight inches, cutting the lower end square across and just below a bud. Use a sharp knife, in order to cut smoothly. After the cuttings are made, bury them in a dry place in the open ground, and cover beyond the reach of frost. Do not tie in bundles, but place in alternate layers of soil and cuttings. In the spring take out and plant, placing them about three inches apart in the rows, covering all but one or two inches of the upper end. Pack the soil firmly around them, and either hoe often or cover the entire surface of the soil with mulch. As the same general system is followed for all ripe wood cuttings grown in the open ground, I will here give my method with the Barberry, the Currant, Gooseberry, and all similar plants. When the cuttings are prepared, select a dry place, and dig a trench one spade deep, in shape like a letter V ; place a layer of cuttings on one side, then throw enough soil from the other side to cover them about an inch deep. Then place another layer of cuttings against this soil, keeping the trench in the same shape as it was when begun, cover the next layer in the same manner, and so on until the cuttings are all in ; then bank over with earth and smooth the surface so that the water will readily run off.

In the spring, prepare a bed for the cuttings by digging or plowing deeply, and enriching with well rotted manure. Harrow or rake the surface level and smooth; then draw a line across the bed, and dig a trench by placing the back of the spade against the line, pressing it down perpendicularly; then throw out the soil to one side, making a trench of the shape shown in figure 1. Place the cuttings against

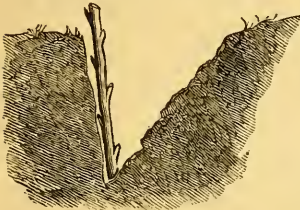


Fig. 1.—CUTTING TRENCH.

the perpendicular side of the trench, two to four inches apart, and the upper end an inch or two above the surface of the soil. Draw in a little soil, and press it down firmly with the foot, or with an instrument made from a piece of two inch plank, as shown in figure 2. After the earth has been packed firmly about the base of the cutting, the trench may be filled up level with the surrounding soil. With many kinds of plants the packing of the soil around the lower end of the cuttings is a very essential point, and often the whole secret of success. This is particularly so with those kinds that produce roots mainly from the lower end, where the wood is exposed to the soil. The distance between the rows will depend entirely upon the manner in which they are to be cultivated. If a cultivator is to be used, then they should be two and a half or three feet apart; but where they are to be cultivated with the hoe one and a half to two feet will be sufficient. In some soils and locations the plants raised from cuttings may be left in the ground where they are grown until the following spring, and then transplanted; but the safest plan is to take them up in the fall, because in some soils they will be thrown out by the frost, unless they have a larger quantity of roots than is usual.



Fig. 2.

BY GREEN WOOD CUTTINGS.—This mode of propagating the Barberry can only be practiced to advantage by those who have propagating houses. The plants should be taken up in the fall and potted, giving each plant sufficient soil and room to insure a healthy growth. They may be placed directly in the house or in frames or cellar until wanted. When they are first potted the soil should be watered so that it will settle about the roots and fill all interstices between them.

When the plants have been placed in the house, and have made a growth of two or three inches, the cuttings may be taken off by severing the new-growing wood close to the main stem; place the cuttings in pots filled with pure sand, fifteen to twenty in a six inch pot, after which give water to settle the sand about the cuttings; then cover with a bell glass, or place in frames within the house, as usual with other green wood cuttings.

Every experienced propagator will understand and know how to treat the cuttings when they become rooted, and those who are novices in these matters would do well to practice a while upon plants less difficult to propagate, before trying the Barberry.

BY BUDDING AND GRAFTING.—The rare varieties are sometimes worked upon the more common kinds, usually by budding. The operation is performed just as soon as the buds are fully developed on the young growth of the season, and in the same manner as upon the apple and similar trees. Grafting is also performed in the usual manner, but the cion should be inserted in the stock below the surface so that all but the upper bud will be covered by the soil.

BY LAYERS.—The usual manner of making layers of other woody plants is applicable to the Barberry, but they will seldom become well rooted the first season. Still they may be severed from the parent plant in the autumn or early spring; the upper portions of the stems are cut off and then they are treated the same as cuttings.

The layers may be made in early spring, of the previous season's growth, or later, when new wood is formed of sufficient length for the purpose. Layers put down in the autumn will become well rooted by the end of the next season.

CULTURE.

The Barberry, when left to itself, forms a dense shrub, with many stems, but when cultivated for its fruit a portion of the shoots should be annually removed to allow the sun and air to more readily reach all parts of the plant, and assist in developing the fruit buds.

It may also be trained to a single stem, and when treated in this manner, some of the varieties will form shrubs ten to fifteen feet in height. The fruit will also be larger and more abundant than when the plant is allowed to grow in the natural manner and without pruning.

Each plant should be given plenty of room and not crowded, especially when fruit is the object of cultivation. Six to eight feet apart will be sufficient in ordinary soil.

As before remarked, the Barberry will grow in dry and almost barren soil; still, as no plant will produce the best results in such situations, it is best to give a good, deep and moderately rich soil even to plants that will grow in a poor one.

VARIETIES AND USES.

Berberis vulgaris.—This species and some of its varieties are probably better known in this country than any others. The most common is the original species, which is found growing wild in many places in the New England States. It is also quite common in gardens. The fruit is oblong, about half an inch in length and one-eighth across, of a bright scarlet color, very acid, but of agreeable flavor. Figure 3 shows a small branch, with fruit and flowers of natural size, and figure 4 gives a magnified single flower. There is a peculiarity about the stamens worthy of notice,

as they are endowed with a remarkable irritability. When the flower opens, the stamens all lay back against the



Fig. 3.—BARBERRY FLOWER AND FRUIT.

petals, but when touched by an insect they spring up against the pistil, where they discharge their pollen. This motion may be produced by touching the stamens near the base with a pin or other point. The



Fig. 4.

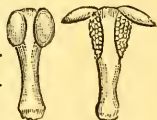


Fig. 5.

stamens discharge their pollen in a rather unusual manner. In most stamens the anther, or pollen-

bearing portion, opens by slits, but in the Barberry a pair of little doors, or traps, lift up to allow the pollen to fall out. Figure 5 shows two enlarged stamens—one closed and the other open.

The fruit and flowers are not produced at the same time upon the plant, but as a matter of convenience they are both shown on the same branch in the engraving. The fruit is much used for preserves, pickles, jams, &c.

The thorny character of the plant, with its upright, compact growth, makes it a very desirable hedge plant.

The inner bark of the stem and roots is used in some countries for making a yellow dye. It is also used in Poland and other portions of the East for tanning purposes.

The best known varieties of this species are as follows:

B. vulgaris alba.—White fruited.—Not very productive, and not so vigorous a grower as the original.

B. vulgaris asperma.—A variety which produces fruit without seeds. It is not, however, constant, and plants propagated from it will often produce fruit with seeds. This variety has been known and cultivated in England for more than two hundred years, according to Parkinson, Gerarde and other old authors.

B. vulgaris dulcis.—Sweet fruited.—Very similar to the species. The fruit is a little larger and not quite so acid, and leaves bright green and shining.

This variety should not be confounded with the before mentioned species, *Berberis dulcis*, as the latter has black fruit of the size of a large currant, which is solitary, while that of the former is produced in racemes.

B. vulgaris purpurea.—Purple leaved.—Leaves dark purple. On this account it is very ornamental.

B. vulgaris glauca.—Leaves pale green and glaucous; not shining.

B. vulgaris longifolia.—Leaves longer than in the species; otherwise the same.

B. vulgaris lutea.—Yellow fruited.—A variety with small yellow fruit; not very productive.

B. vulgaris mitis.—Thorns small and not as rigid as in other varieties.

B. vulgaris nigra.—Black fruited.—Tournefort found his variety on the banks of the Euphrates, about one hundred and fifty years ago. He says that the fruit is of a sweet and delicious flavor. I am not aware of its being cultivated in America.

B. vulgaris purpurea.—Purple fruited.—Fruit dark red or purple. Leaves narrow, with few prickles.

B. vulgaris violacea.—Violet fruited.—Fruit violet colored.

There are probably many other varieties of this species, as the seedlings usually vary considerably, especially when the seeds are taken from kinds that are quite distinct from the original species.

Seedlings grown from the purple-leaved variety will show a great diversity of foliage. Some will have purple leaves like the parent, while others will be margined with purple or red, or be wholly green.

Berberis Sibirica.—Siberian Barberry.—Native of Siberia, where it is found growing among rocks on hill sides and mountains. The plant seldom grows more than two feet high. Fruit oval, red, solitary, peduncle shorter than the leaves.

The following, which may be distinct species, or only varieties, possess no particular merit as regards their fruit, but may interest the botanist or those who wish to make their collections as complete as possible:

B. Iberica.—Iberian Barberry.—Berries deep purple.

B. Sinensis.—Chinese Barberry.—Berries dull red.

B. Cretica.—Cretan Barberry. — Berries oval, black, very astringent.

The Barberry is susceptible of great improvement, and might, if a proper amount of care were bestowed upon it, become a fruit of much importance; whereas, at the present time, it is seldom admitted to the fruit garden, being mainly planted for ornamental purposes.

DISEASES AND INSECTS.

The Barberry is seldom injured to any considerable extent by disease or insects. The leaves are sometimes injured by a species of fungus called *Æcidium Berberidis*. It usually makes its appearance on the upper end of the



Fig. 6.

leaves (fig. 6), then becomes scattered over the surface, and extends to the fruit. To the eye it appears like fine reddish dust. When these rust-like spots are examined with a lens, they appear as in figure 7, and when more highly magnified the whole is found to consist of cup-like cells, as in figure 8.



Fig. 7.

These cups are at first covered with a thin, light colored film, which, when the fungus be-

comes mature, bursts and leaves the edges of the cup with the uneven margin shown in figure 8. When this covering bursts, the cups discharge their spores or reproductive dust, which is scattered over the leaves and fruit.

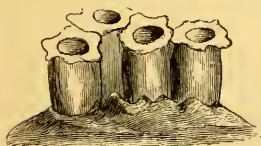


Fig. 8.

This fungus or mildew has been supposed to cause the blight in wheat, and it is an old belief that the Barberry would cause the grain near which it grew to blast. This belief has generally

been treated as a superstition by scientific men, but recent researches show that it may have a foundation in fact. Many of these minute fungi have in different generations very unlike forms. Thus, the spores of A will produce

B. so unlike A. that it has been taken for a different fungus, and B. will again reproduce A. There is a strong probability that the rust of the Barberry and the smut in wheat are both forms of the same fungus.

The injury which it causes to the Barberry is very slight, but it may become so prevalent as to be worthy of particular attention. Ashes or slacked lime scattered over the leaves in the morning, when the dew is on them, would probably destroy it or check its progress. Another blight which affects the leaves later in the season, known as *M. crospheeria Berberidis*, is shown highly magnified in figure 9. It appears in very minute spots, with fine, rib-like ap-

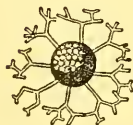


Fig. 9.

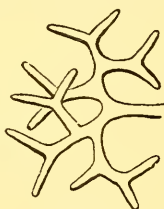


Fig. 10.

pendages radiating from the center, like the spokes of a wheel, the ends of each being divided into several small branches, as in figure 10. This species of blight attacks the leaves so late in the season that it causes but

little if any injury. The illustrations of these and the other minute fungi given in subsequent pages, are taken from a work called "Rust, Smut and Mildew," by M. C. Cook, London. This charming little work is beautifully illustrated, and as it describes many fungi common to both this country and England, we call the attention of our readers to it, as the most available source of information concerning these humble, but, to the fruit grower, important forms of vegetation.

I am not aware of any insect that is injurious to the Barberry. The peculiar (and rather agreeable than otherwise) fragrance of the flowers attracts numerous insects to the plant when in bloom, and their presence is probably for the purpose of gathering food, while they aid at the same time in fertilizing the flowers by irritating the stamens

CHAPTER II.

THE STRAWBERRY.—FRAGARIA

NATURAL FAMILY *Rosaceæ*.

[Name derived from *fragrans*, perfumed in reference to the fragrance of the fruit. French, *Frasier*; German, *Erdbeerpflanze*; Dutch, *Aadbezie*; Italian, *Pianta di fragola*; Spanish, *Freza*. The name of Strawberry is said by Pryor to be derived from the Anglo Saxon "*Streoberie*," either from its straw-like haulms, or from their laying strown upon the ground. Other authors give different derivations.]

GENERAL CHARACTERS.

Calyx flat or reflexed, deeply five-cleft, with the same number of bractlets, thus appearing to be ten-cleft. Petals five, white, erect, spreading. Stamens many, usually about twenty. Pistils numerous, adhering at the base to the small seed-like fruits, these are situated on the fleshy receptacle, which enlarges and becomes what is generally called the fruit or berry. Increased by seeds, runners and divisions of the roots. Stemless perennials, with or without runners. Leaves radical, divided into three leaflets, obovate wedge-form, coarsely serrate, evergreen. Root fibrous, rather woody, perennial.

SPECIES

***Fragaria vesca*.**—Edible Strawberry, Alpine Strawberry, Wood Strawberry, &c.—Seeds superficial, on the conical or hemispherical fruiting receptacle (not sunk in a cavity). Flower stalks longer than the leaves, erect, hairy, hairs closely pressed upward. Fruit drooping, usually conical, sometimes globular. Leaves thin, pale green; upper surface uneven, slightly wavy. Native of Europe and America.

Fragaria collina.—Green Strawberry.—This is considered by some botanists as a species, but the only really distinct character is in its fruit, which is greenish-brown when ripe.

Fragaria elatior.—Hautbois Strawberry.—Calyx reflexed. Seeds superficial. Flower stalks longer than the leaves, erect. Fruit round or oblate, usually drooping, but sometimes erect, possessing a strong musky flavor. Hairs on both leaf and flower-stalks long, and widely spreading, somewhat reflexed. Leaves larger than in *F. vesca*, and more or less pubescent, covered with short hairs on both upper and lower surface, giving them a rough appearance. Native of Germany.

Fragaria Indica.—India Strawberry.—A species with yellow flowers. Fruit not edible. Native of India.

Fragaria Virginiana.—Virginian Strawberry.—Seeds imbedded in the deeply pitted receptacle. Fruit roundish, ovoid to conical, highly perfumed. Flower stalks shorter than the leaves, hairy; hairs spreading, more or less erect. Leaves obovate, wedge form, variable, coarsely serrate, usually dark green; upper surface smooth, often shining. Native of North America. Chiefly in the United States and southern portions of Canada.

Fragaria grandiflora.—Large flowering Strawberry.—Calyx erect, slightly spreading. Seeds set in a shallow depression. Flowers larger than in other species. Fruit sweet, perfumed. Flesh firm. Flower stalks shorter than the leaves. Leaves smooth, usually deep green. Serratures broadly ovate. Native of South America.

HISTORY.

It is of little consequence to the horticulturist of the present day whether any particular kind of fruit familiar to us was known in ancient times. Still, we often find ourselves sending a thought back into the dim and uncertain

past, picking up here and there a stray word or line that informs us that some of the fruits now cultivated by us were also known to those of former ages.

The number of such old time fruits is quite limited, and most of them are of quality so inferior that we would hardly be willing to exchange those of our time for the productions of any period.

The Strawberry was probably not cultivated in olden times, as it is scarcely mentioned by the Roman writers on agriculture. Some who are most explicit in other matters pertaining to fruit-culture do not mention it, while Pliny, Ovid and Virgil only casually refer to it, and this reference is not for the purpose of aiding its culture.

From a few lines in one of those old works, we infer that the children in ancient times had similar tastes to those of the present, and that they found no day so hot, or hill so steep, as to deter them from seeking the little gems in the tall grass, or through bramble and wood. We, who were so fortunate as to spend our youthful days in the country, can appreciate the following lines of Virgil, as translated by Warton, as they touch a heart-string whose vibrations send memory back to joyful days in the past:

"Ye boys that gather flowers and strawberries,
Lo, hid within the grass a serpent lies."

We learn from the ancient writers nothing in relation to Strawberry culture that is of any practical value. We are, therefore, compelled to turn to those of modern times for any reliable information.

There are facts connected with the history of the Strawberry that it is important for us to know.

For instance, from what country, climate or situation were certain species derived? If a species came originally from a very warm country, it is doubtful if it will ever be so well adapted to a cold latitude as one obtained from a climate similar to the one in which it is to be cultivated.

By hybridizing, we may so intermingle species that it

will be difficult to tell from what particular source they originated. Yet, if there be any feeble or tender element in their composition, it will be constantly showing itself, and a continual source of annoyance to the cultivator. It is for this reason that it is always desirable to know as much of the history and origin of a fruit as possible, specially if it is to be selected as the parent from which new varieties are to be produced.

There are instances where a species has succeeded better in a foreign country than at home; but such cases are only exceptional, and where the climates are similar, or the species naturally had a very wide range in latitude.

The Strawberry is probably more widely distributed than any other plant we cultivate.

The *Fragaria vesca*, or Alpine Strawberry, grows in the mountains of Greece and northward to Britain, where, in the latter country, it assumes a different form, and is there called the Wood Strawberry.

The principal difference between the two is in the form of the fruit, the Alpine being conical, while the Wood varieties are round. The Alpine Strawberry is also a native of North America, being found in high woods and fields in most of the Northern States, and far to the North in the Canadas. There appear to be several natural varieties of this species in Europe, which have been known for several centuries. In 1483, the garden of the Bishop of Ely, at Holborn, in England, was celebrated for its excellent Strawberries. They were probably the common Wood Strawberries of the country—one with red fruit, the other white. The Alpines were introduced into England some two hundred years later. There are two original varieties the same in color as the Wood Strawberries. There are also monthly varieties, and those which do not produce runners.

The original species or varieties appear to persistently retain their normal characteristics under all the varied

changes which they have been subjected to in cultivation. This constancy of the *F. vesca* may account for the fact that no advance, of any importance, was made in Strawberry culture in Europe until other and more variable, as well as valuable, species were introduced.

In 1578, Lyte, in his translation of "Dodoens Herball," mentions only the Wood Strawberry. Gerarde, in 1597, named the White and Red Wood Strawberry. In 1623, Casper Bauhin, in his "Pinax," mentions the White and Red Wood, Alpine, and Hautboy or Haarbeer Strawberries. Parkinson, in his Paradisus, 1629, page 528, says that there are divers sorts in cultivation, and names the Red and White Wood, Green, Virginia, and another variety, which he called the Bohemian. In his Theatrum Botanicum, issued in 1640, page 758, he mentions a variety of the Alpine, which, he says, is barren, producing no fruit. It was probably one of the Potentillas, and not a Strawberry, for he also describes another variety which, he says, has yellow flowers, and the seeds are in a dry, compact head, and the plant has smaller leaves, and creeps along the ground with many fine stems.

About 1660 a Strawberry grower at Montreuil, in France, is said to have produced a new variety from the seed of the Wood Strawberry. It was called the Cappron, but afterwards the Fressant. This is the first improved variety of which we have any account. It was in cultivation at the time that Evelyn translated Quintinies "French Gardiner," in 1682; also mentioned by Duchesne, about a hundred years later.

The persistency with which some species reproduce themselves is quite remarkable, but not more so than the equally great variations that are constantly being developed in others.

Those species from which we have produced the greatest number of valuable varieties, generally show the greatest diversity of character in their natural or normal condition.

The Virginian Strawberry, which is the most common Strawberry of our woods and fields, was introduced into England early in the seventeenth century; but little attention, however, was paid to its cultivation for nearly or quite one hundred years thereafter. But as soon as its valuable qualities were discovered, and it was found that by merely sowing seeds new varieties, greatly differing from the parent, were readily produced, it began to attract the attention of fruit growers, and received the care it deserved.

It is the most fragrant of all known species, possessing a delightful, aromatic perfume, not surpassed by any other fruit. It is a robust and vigorous grower, withstanding the severe cold of our northern winters, as well as the burning sun of summer. It assumes very distinct characters in different locations, those of the Western States varying considerably from those of the Eastern, so much so that the varieties grown from them usually retain their peculiar characteristics through an almost indefinite number of generations.

Among the varieties in cultivation at the present time we can recognize many whose parentage can be traced to the western plants, while others are unmistakably from those of the Eastern States. I will name a few of each class, and those who are acquainted with them will more readily recognize their peculiar characters than they could from any descriptions which I might give—only premising that the western class, as a rule, produce the largest, softest, and most acid fruit.

The best known of the western type are: Austin, Iowa, Downer's Prolific, Green Prolific, General Scott, and Victory.

Of the eastern type, Early Scarlet, Jenny Lind, Scott's Seedling, Boston Pine, Brighton Pine, &c.

The various forms observed in the *F. Virginiana* in different portions of the country, have given rise to much dis

discussion as to whether all these variations should be classed as one species, or separated into different ones. Dr. Asy Gray classes them all as one species, and he is undoubtedly correct.

A few *would-be* authorities will not acknowledge that a species can possibly be variable, and still be the same. Consequently we often see long essays from such men, in which the *F. Virginiana* is divided into numerous species, such as *F. Illinoensis*, *F. Iowaensis*, &c. We might with as much propriety separate our American chestnut into innumerable species, for there is as great difference in the nuts and growth of the tree as is to be found in the common Strawberry.

Free discussion in scientific matters is to a certain extent beneficial; but it is doubtful whether the present or future generations will be benefited by such dissertations as frequently appear in some of our rural periodicals or in our agricultural reports, purporting to come from intelligent men, while the fact is apparent to every one who has the least knowledge on the subject of which they treat, that said articles are a mass of errors, and the authors write for other purposes than those of giving information to the people.

For a number of years the Virginia Strawberry had no successful rival in English gardens, though it was never so highly appreciated in Britain as here, from the fact that it is more acid and not so highly flavored in the moist cool climate of that country as in our own.

The introduction of the South American species (*F. grandiflora*) gave a new impetus to Strawberry culture in Europe.

The fruit is naturally much larger and sweeter than any of the other species, consequently it does not require so much heat to develop its saccharine qualities. That peculiar aromatic sprightliness, which is such a prominent

feature in the *F. Virginiana*, is, however, almost entirely wanting in other species.

The same dissecting process has been applied to the South American species as to our northern one, and it is sometimes called *F. Chiliensis*, *F. Bonariensis*, &c.—the name usually indicating the place from which the supposed distinct species was derived. That the different varieties discovered in the various portions of the country are quite distinct, every one who is acquainted with them will admit. Yet these variations are no greater than have already been mentioned in those of other species.

The first account we have of the South American Strawberry is in 1716, when M. Frezier, in his voyage to the South Sea, found it at the foot of the Cordillera Mountains, near Quito, and carried it home to Marseilles, in France.

It was at that time called the Chili Strawberry, and the Spaniards said that they had previously brought it from Mexico.

We do not learn from any of the old French works that any new varieties were raised from the Chili Strawberry for at least fifty years after its introduction. Duchesne, in 1766, says “that Miller considered its cultivation as abandoned in England on account of its sterility.” The importations from other portions of South America appear to have met with better success, and about fifty years ago new varieties of the *F. grandiflora*, as well as of the *Virginiana*, became quite abundant in England and on the Continent.

At the present time the varieties of *F. grandiflora* appear to be valued more highly in Europe than any other—at least we judge so from the fact that almost all of the new varieties imported of late years show more of the characteristics of this species than of others. This may account for the failure of so many of the new foreign varieties in the Northern States. The severe cold of our winters, and our

dry, hot summers, are two extremes that they cannot withstand.

Occasionally we receive a variety which, by extra care and protection in winter, will produce a large crop; but, as a whole, it is doubtful whether the Strawberry growers in the United States have been permanently benefited by the introduction of any of the new varieties raised from the *grandiflora*. They may have awakened a taste for more thorough experiments in Strawberry culture, and by hybridizing them with our more hardy kinds produced new ones of real value.

SEXUALITY OF THE STRAWBERRY.

Naturally the Strawberry flower possesses stamens and pistils; it is therefore perfect, as both of these organs are necessary for the production of fruit. Every botanist, from Linnæus down to the present time, has described the Strawberry flower as perfect or bi-sexual.

Therefore, to assume that this is not the normal character (as a few writers of late have done) is to controvert all of our botanical authorities, and charge them with overlooking that which the most casual observer could have seen. When plants are taken from their native habitats and placed under cultivation, they very often assume forms quite different from their natural ones. Sometimes a particular organ is suppressed, while others are enlarged; thus we have the pistillate Strawberry and the double rose.

Occasionally the seeds of domesticated plants are carried by birds or animals to woods and fields quite distant from the garden in which they are cultivated, and if perchance they are deposited under favorable conditions they will produce fruit similar to that from which they originated. If we find a pistillate Strawberry or double rose growing wild, does it prove that these are the normal characters of the genus? Far from it; but it only shows that

plants are susceptible of change under certain circumstances, and especially when these are not perfectly natural.

The Strawberry belongs to the same great natural family as the rose, but when placed under those artificial circumstances to which it is subjected when cultivated, instead of becoming double, (although semi-double varieties are occasionally produced,) the stamens are sometimes suppressed, and varieties are produced with flowers containing pistils only.



Fig. 11.—PERFECT FLOWER.

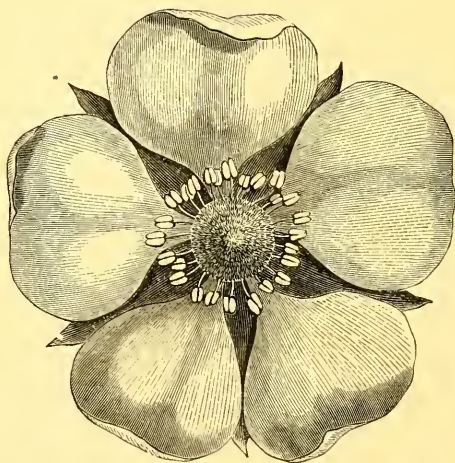


Fig. 12.—PERFECT FLOWER ENLARGED.

Figure 11 shows what is termed a perfect or bi-sexual flower. The pistils are in the center, while around them

are some twenty or more organs, which are called stamens. These are quite different in appearance from the pistils, being longer, and each one is terminated by a small knob, which is called the *anther*. The anthers contain *pollen*, a

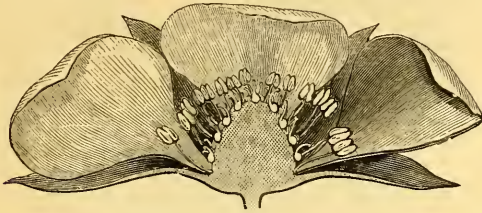


Fig. 13.—SECTION OF PERFECT FLOWER.

substance that is necessary for the production of seed. In figure 12 is shown the same flower as in figure 11, but, being considerably enlarged, the stamens are more readily seen. The same flower is shown in figure 13, divided longitudinally to show the parts still more distinctly, and their relative positions.

Every so-called seed of the Strawberry has one pistil situated on its apex; consequently it is a very important organ, inasmuch as it is through this channel that the influence of the pollen reaches the ovule or seed vessel.

The stamens are situated on the calyx, and they may be artificially removed or suppressed by nature, in which case we have a pistillate flower which will produce fruit, if the pistils are fertilized from another flower. It is not important whether a flower produces its own pollen or is supplied from another source.

Figure 14 shows a pistillate flower of the usual size, and in figure 15 the same enlarged. By comparing these with the two preceding the difference may readily be observed.



Fig. 14.—PISTILLATE FLOWERS.

The size of these is also variable; sometimes they are

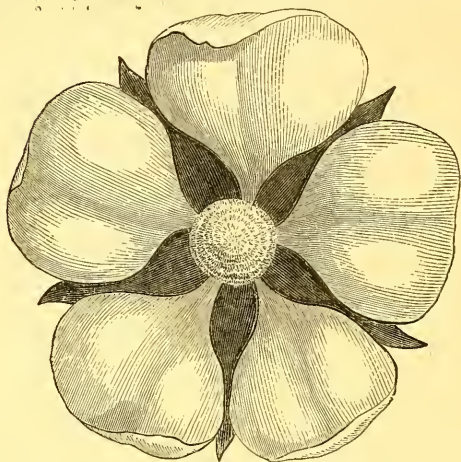


Fig. 15.—PISTILLATE FLOWER ENLARGED.

considerably larger than those shown as of natural size.

The flowers of *Fragaria grandiflora* are larger than those of other species, and sometimes they have seven petals, as shown in figure 16, while five is the usual number.

Another variation from the natural form, although very rarely seen, is that of flowers without any pistils. These, of course, produce no fruit, and they are nothing more nor less than degenerated or deformed specimens, and are not worthy of notice further than to show the peculiar changes that sometimes occur in cultivated plants.

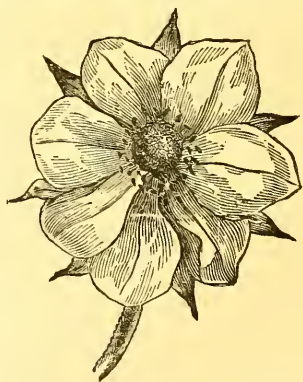


Fig. 16.—FLOWER WITH 7 PETALS.

The foregoing are the principal forms noticed in both

wild and cultivated varieties, but there are various gradations from each of these; for, while the natural flower generally contains about twenty stamens, some cultivated varieties have less than half that number, while others, as I have shown, possess none. Consequently, if a variety is produced which has flowers destitute of stamens, it will be dependent upon others for fertilization. Many such have from time to time been produced and disseminated in the last fifty years. That some seedlings produced perfect flowers, while others have those that are imperfect, was observed in Europe at least a hundred years ago. This peculiarity was first observed in the seedlings of the Hautbois, but afterwards in the seedlings of other species, although it does not appear to be of so common occurrence in Europe as in the United States.

The reason for this I am not able to state, unless it be because the *Fragaria Virginiana*, from which the greater portion of our varieties is produced, is more subject to the change than other species. It may be that our climate has something to do with it, but whatever may be the cause, the effect is apparent in many pistillate varieties of Strawberries in cultivation.

Keen reported his observations upon this variation in the sexes of the Strawberry, in 1809, to the London Horticultural Society. This called the attention of growers in this country to the subject, but very little was said or written in relation to it until Mr. Hovey produced his seedling Strawberry in 1834.

This being a pistillate, and the largest and best variety that had been as yet produced in this country, it gave rise to an immense amount of discussion upon the sexuality of the Strawberry. There appear to be a few men who are always ready to ride any new hobby, whether it has one leg or more. Consequently there were a few who immediately started the theory that the botanists had made a great mistake, and that the Strawberry was naturally di

œceous, i. e., one plant bearing staminate flowers and the other pistillate ones.

Considerable excitement was created in consequence, and communications innumerable upon the subject were poured into our horticultural journals, each writer claiming to have discovered something new in regard this, to them, wonderful phenomenon.

One writer has for the past ten years or more, almost annually, given the public a grand diagnosis of the case, asserting that the pistillate varieties were the only ones to be depended upon for a large crop, and that they were naturally the most productive, while the facts are that there are hundreds of perfect flowering kinds in cultivation that are fully equal, if not superior, to the most productive pistillates. That we have many very excellent varieties among this latter class no one will deny, but that, as a whole, they are any better than the others cannot be substantiated by facts.

There is but one serious objection to the pistillate varieties, and that is, two kinds must be grown to insure a crop from one, or a perfect flowering variety must be grown near a pistillate to fertilize its flowers, or no fruit will be produced. This is imperatively necessary; consequently the close proximity of the two kinds has led to much confusion, inasmuch as the runners of the two are very liable to intermingle, unless great care is exercised to prevent it. I have usually found it more difficult to get pure plants of the pistillate varieties than of the others, and the excuse given by the grower for the mixture was that the variety grown for the purpose of fertilizing them had become intermingled. If this is the only reason, it is certainly a very lame one, as there is no necessity for the plants being mixed, because setting the two kinds in adjacent beds will answer every purpose.

But without presuming to advance a theory on the subject, I would suggest whether it is not possible that varia-

tions may have been made on growing plants by the influence of the pollen from different varieties. It is generally supposed that no effect is produced except on the seeds, but as it is most conclusively proved in animal physiology that the female retains the effect of the first impregnation in her system for years, may not the same be true of plants, and the admixture or deterioration of one, and the improvement of another kind growing in close proximity, be caused by the absorption of qualities each from the other?

If the effect of the pollen reaches no further than the seeds, why is not the fruit (receptacle) produced without them. But we find that wherever the pistils are not fertilized the receptacle also fails, or if a portion only is supplied with pollen then the receptacle is deformed in proportion. Remove one, two, or more pistils before they are fertilized, and the berry, just at that point, fails to enlarge or come to maturity. No seeds, no berry, is the rule.

If the Strawberry seed was large enough to be readily examined, we should probably see a difference in color and form just as we notice in mixed varieties of corn. In the latter we can see that the influence of cross fertilization extends further than the seed, because its receptacle (cob) is often changed beneath the kernel to a color similar to that of the variety which produced the pollen.

It is often asserted that the Hovey is better when fertilized with one kind than with another, and may not this be true further than that of being fully supplied with pollen?

Strawberry culture would probably have been just as far advanced if we had never had a pistillate variety in cultivation, and much confusion would have been avoided. Had not Mr. Hovey produced so good a pistillate variety as he did, it is very likely that such kinds would have never been tolerated by fruit growers anywhere. But the advent of this variety gave a new impetus to Strawberry culture, and at the present time it is considered in some sections as a standard market fruit.

Another important consideration in cultivating pistillate varieties is to grow as a fertilizer a kind that produces an abundance of pollen ; besides that the two should bloom at the same time.

STRUCTURE OF THE PLANTS.

All the varieties and species of the Strawberry have a family resemblance ; still there is considerable difference in the form and structure. Some produce large stools, while others naturally divide into individual plants. One of the prominent features of the Strawberry is to multiply by runners ; yet among the Alpine or Wood species we have varieties which produce none or very sparingly. Therefore it is apparent that the different forms will require different treatment. Some have long, slender, wiry roots, while others have very short, fleshy ones, each of which require a soil suited to their growth, if the very highest development is obtained.

Our native varieties, particularly those grown from the *F. Virginiana*, have longer and more wiry roots than those grown from the *F. grandiflora*. Consequently they are better suited to field cultivation, and where the soil is not frequently stirred, or upon light soil, the roots will spread further in search of food and they are not so readily affected by drouth.

There is another peculiarity in the form of the roots which is worthy of attention. The native Strawberry produces stools, but the crowns, instead of adhering together, often separate as they become old, each producing roots for self-support.

To show more fully the peculiar form usually observed in the varieties of the *F. Virginiana* and *F. grandiflora*, I have inserted the two following illustrations taken from the Strawberry Culturist.

Figure 17 is an exact representation, half size, of a plant of the Boston Pine that is three years old. While it



Fig. 17.—OLD PLANT OF BOSTON PINE.

shows a number of crowns, there are not more than two united on one stem. Varieties of this class naturally divide, and do not form large or very compact stools; consequently the crowns remain more nearly on the level of the surface than when they are united, as seen is figure 18, which represents a plant of Triomphe de Gand of the same age as the other.

A, C and D represent the side crowns, and B the central one; E, the old fruit stalk of the present season; F, F, new roots starting from the base of the side crowns above the soil. In this variety the crowns are produced almost on the top of the old ones; consequently the plants are continually becoming higher, until, at last, the new roots cannot reach the soil, and the plant languishes and dies. Although the Strawberry root is perennial, still one new root is of more importance to the plant than a dozen old ones. The difference in the structure of the two plants suggests the need of a peculiar cultivation for each, and by experience we have learned that many of our native varieties will remain productive for many years, even when allowed to grow without cultivation, while very few of the varieties of *F. grandiflora* will succeed under similar treatment.

To keep a succession of new roots and continued vigor for a number of years, those varieties with roots similar to the Triomphe should be grown in rows or hills, so that fresh soil may be drawn up to the plants when required. I do not wish to be understood as advocating the cultivation of plants for a long time without removal, but throw out these hints for the purpose of showing that frequent removals are more necessary with some than with others.

PROPAGATION.

There are three modes of propagating the Strawberry in use at the present time, viz. : seeds, runners and divisions of the roots.



Fig. 18.—OLD PLANT OF TRIOMPHE DE GAND.

BY SEED.—To obtain seeds, the fruit should be gathered when fully ripe, spread out and dried, thus preserving it in the pulp; or the fruit may be crushed in water and the seeds washed out cleanly. The good seeds will sink and the pulp will remain on the surface, from which it can be readily removed.

The seeds may be sown immediately, or kept until the next spring.

The plan which I have usually adopted in raising seedlings is as follows:

Gather the largest berries of the very best varieties to be obtained, then mix them with dry sand, crushing the fruit, and so thoroughly manipulating the mass that no two seeds will remain together. Then sow the sand containing the seed, either in some half shady situation in the open ground, or in pots or boxes. The soil in which they are sown should be light and friable, and the seeds not covered more than one-quarter of an inch deep. Keep the soil moist, and the plants will usually begin to appear in four to six weeks after sowing. When they have formed four or five leaves they may be transplanted into the open ground—if they have been started in pots or boxes. When sown in the open ground, it is best to let them remain in the seed-bed until the following spring, protecting them with straw, leaves or other similar material in winter. Transplant into rows at least two feet apart, and the same distance in the row; keep off all runners the first season and hoe often.

Occasionally a seedling will produce fruit the second season—that is, plants started in the autumn will fruit the next spring; but they will not be strong enough to bear fruit that will be a reliable indication of their future value. It is best to protect the plants the first and second winters, if no longer, so that they will have nothing to obstruct their full development. The third season, look over the plants very carefully when in bloom, and mark the sex of

each, so that it shall be known when the fruit is ripe whether the flowers are pistillate or perfect. When a variety has been produced that promises well, it should be carefully taken up and planted by itself, that its runners may have an opportunity of taking root without intermingling with others.

The plant may be removed just so soon as the character of the fruit is determined upon, always choosing a wet day if convenient; if not, give the soil about the plant a good soaking, and then remove it with as much soil adhering as possible. Shade it a few days after removal to prevent its wilting.

I would caution the novice not to be too sanguine about the value of new seedlings, because they will very often appear much better the first season than ever after.

A few years since I raised a large number of seedlings, and when ripe, a committee of six very competent gentlemen was appointed by the Farmers' Club of the American Institute to examine and report upon them. Seventy varieties were marked and described as very promising and worthy of further trial. Seventy beds were very thoroughly prepared, and each original plant carefully placed in the center of one of these beds. About a dozen runners were allowed to grow from each plant, and all others removed. The next season the same committee examined them again, and they reduced the number to seven. These were given more room and continued care until another season, when the number was reduced to three.

I give this as the result of only one experiment; others might be given with similar results. It is a very easy matter to originate new varieties, but to get one that shall be superior, or even equal, to the best now in cultivation, is not so readily accomplished as some may suppose.

I would advise every one to try, because there is a chance of producing one that will be better adapted to

the grower's soil or location than any that could be produced elsewhere.

PROPAGATION BY RUNNERS.

The varieties mainly cultivated in this country are propagated from the runners. The first produced are usually the strongest and best for early planting, but those that are formed later in the season are equally as good when they arrive at the same age or size. A few theorists have maintained that the first plants formed near the parent stool were the only ones that should be used, and that they were far superior to the others, and would always be more prolific. This assertion is not supported by facts; consequently is not worthy of a moment's thought. To insure the rooting of runners, the surface of the soil should be kept loose and open, and if the weather is very dry at the time they are forming, it is well to go over the beds and cover the new roots as they are produced. When only a few very large and strong plants are wanted, it is well to pinch off the runner just beyond the first plant, that this may become strong and vigorous.

POT PLANTS.

In the first edition of this work I stated that it was a good plan, in order to insure the safe removal of the runners, to plunge pots filled with rich soil in the beds, and let the roots strike into them, then, when well rooted, the young plants could be taken up and removed with perfect safety. This hint seems to have led our strawberry growers to introduce the pot-grown or layered plants, as a distinct feature in their business, and for the past few years the merits of plants thus propagated have been highly extolled in nurserymen's catalogues. To propagate plants in this manner is certainly far more expensive than to allow the runners to take root in the ordinary way, and without assistance on the part of the cultivator, and they

are also worth more because less liable to fail when transplanted or transported to any considerable distance. It is true that the pot-grown plants will yield a moderate crop the following season, an advantage which amateur cultivators appreciate far more highly than do those who cultivate fruit for market ; but it is a question if the few berries thus obtained are really worth the extra price asked, and the care required to produce them. This, however, is a matter for the purchasers of plants to decide ; the propagator's province is to supply whatever is in demand. Any small plants which have not produced sufficient roots to insure their safety during winter, may be taken up and set in cold frames, where the roots will continue to grow until the soil is frozen.

The richer and better the soil, the more rapid will be the production of roots, whether in frames or in the open ground. It is a good plan to cover the surface of the soil with fine pure manure before the runners start in spring. The runners draw their sustenance from the parent plant until they have formed roots of their own, but these roots should find food soon after they are emitted. If the beds can be watered, it will insure the rapid emission of roots.

PROPAGATION BY ROOT DIVISIONS.

This mode is seldom practised except with the Bush Alpine Strawberries, which produce few or no runners. In the early spring, take up the stools and divide them, leaving only one crown to the plant. If the old root is very long, it is best to cut off the lower end, and plant as deep as can be done without covering the leaves.

SOIL AND SITUATION.

No one kind of soil is equally well adapted to every variety. A deep, rich, sandy loam is most generally recommended, and is perhaps on the whole the best.

Still a light sand or heavy clay may be made, with a very little expense, to produce abundant crops.

A deep soil, whether it be naturally light or heavy, is one of the requisites imperatively demanded by the Strawberry. If the soil is naturally very wet, it may require underdraining; but there are few farms on which a situation may not be found where deep plowing will not render the soil suitable for a Strawberry bed. Thorough preparation of the soil is the very foundation of success, therefore no slovenly system—such as once plowing and harrowing—should be tolerated; but the ground should not only be plowed, but cross-plowed, and if not naturally deep and friable, it should be subsoiled at least sixteen inches deep. If the cultivator will only bear in mind that one acre prepared in the best manner will produce more fruit than three or four acres fitted as is usually done, he will understand the importance of doing it well.

There is not one acre of Strawberries in a thousand, that yields over one-half that it would if the ground was properly prepared before planting. It is with Strawberries as with other fruits—too many acres and too little care.

The situation should be open and airy, because in such there is less danger of injury by late spring frosts.

To secure early ripening, a southern exposure is preferable, and for a late crop a northern one. By planting the earliest varieties in a warm situation, and the latest in a cool one, the season may be considerably lengthened.

MANURES.

The Strawberry is not very particular as to the kind of manure it receives, provided it is in sufficient quantities. To tell a man who cultivates the Strawberry on the rich prairie soil of the West that he must apply manure to his soil before planting, would be considered a very foolish recommendation; but to undertake to grow them on almost any of our eastern lands without it would be equally absurd. In fact, most of our fruit growers in the Eastern States determine their profits in advance, simply by the

amount of manure applied to the soil—the more abundant the application the greater the profits.

All plants require food, and it is evident that if it is not in the soil it must be placed there, or no satisfactory results will be obtained. In the Eastern States we gather fruit in proportion to the amount of plant-food which we place in the soil.

Old and thoroughly decomposed barn-yard manure is scarcely to be excelled for the Strawberry. But it is often the case that a sufficient quantity of this cannot be obtained, and if so, then the next best thing to be done is to make a compost of barn-yard manure and muck, leaves or sods, using one load of manure and two of either of the others. Mix them together, and let them remain in a heap for three months or more, not forgetting to turn it over at least once a month.

In heavy soils fresh manure may be used without injury, and if a liberal application of peat or light friable muck is given it will be very beneficial. In sandy soils a compost of muck and manure is one of the best fertilizers that can be applied. In fact, pure muck from the swamps, placed where it can be frequently stirred, will become in one season suitable to be applied directly to the roots of almost any plant.

If lime, ashes, spent hops from the breweries, castor pomace or any similar materials be added, even in small quantities, it will assist very much in its decomposition and fitting it for the use of plants. There are thousands of acres of land in the Eastern States that are now producing nothing, not even weeds, because manure cannot be obtained in sufficient quantities to make them fertile, and yet in many instances these very acres are bordered with muck-beds which are nothing more or less than inexhaustible deposits of manure.

The time is probably not far distant when these mines

of wealth will be worked to an extent not dreamed of at the present time.

Concentrated manures—such as bone, guano, poudrette, &c.—are sometimes used upon the Strawberry with good results. It requires some care in their application, or the plants are liable to be injured thereby.

Ashes are also valuable, particularly on sandy soils. They may be applied by scattering upon the surface at the rate of from ten to twenty bushels per acre. A far more preferable mode is to compost them with muck or leaf mold from the woods, but they should never be mixed with manure, for they will cause it to give off, in the form of gases, the very materials which should be retained.

Lime is said to be injurious to the Strawberry, particularly when applied directly or alone. I have had no personal experience with it upon the Strawberry, but have known several instances of failure, the cause of which was attributed to the use of lime.

TIME TO PLANT.

Spring and fall are the two seasons in which the Strawberry is usually transplanted. Although with the requisite care the operation may be performed at any time during the summer, the spring seems to be the more natural and preferable one of the two.

The plants are then just starting into growth after their long rest. The small amount of foliage which has survived the winter is fully matured; consequently it calls for very little nutriment from the roots. The warm spring rains supply the plants with moisture, and the very atmosphere of this season appears to be full of life.

Fall planting is usually performed in August and September in the Northern States.

This season has one advantage, and that is: if the plants can be set so early that they will become firmly

rooted before cold weather, they will sometimes produce a partial crop the ensuing season, as well as make a stronger growth, than if the operation is deferred until spring.

When one has the plants so near at hand that they can be removed without having their roots exposed to the air for a few moments even, besides having an opportunity of selecting rainy or cloudy weather for the operation, then it may be done in the autumn with success. But when the plants are to be brought from a distance, and when, as it will often occur, they arrive in a time of drouth, fall planting becomes a doubtful advantage. I do not wish to discourage fall trade in Strawberry plants; yet from an experience extending over many years in both buying and selling plants, I conclude that fall planting is far more uncertain than spring.

PREPARATION OF PLANTS.

When plants are taken up in spring there will be more or less dead leaves upon them; these should all be removed, leaving only those that appear fresh and green. Some roots will be broken, and the sound ones, if long, cannot readily be placed in the ground again without being crowded or otherwise thrown out of their natural position. To avoid any difficulty on this point, I always shorten them to at least one half their length.

Figure 19 shows the position of the roots on a medium or small plant before removal, A, being the runner connecting it with the parent plant; B, a new runner on which other plants would have been formed, provided the season had been favorable for their growth; C, D, the cross line showing where the roots should be cut after the plant is taken up. This shortening causes them to throw out a new set of fibrous roots from the cut ends.

It also causes roots to be emitted more abundantly from near the crown than would have been the case if the roots

had not been shortened. Figure 20 shows the same plant as it will appear after having been planted a few weeks.

It is not necessary to trim each plant separately, but a handful may be pruned at one cut of the knife. Plants thus pruned are more readily planted, and the roots are

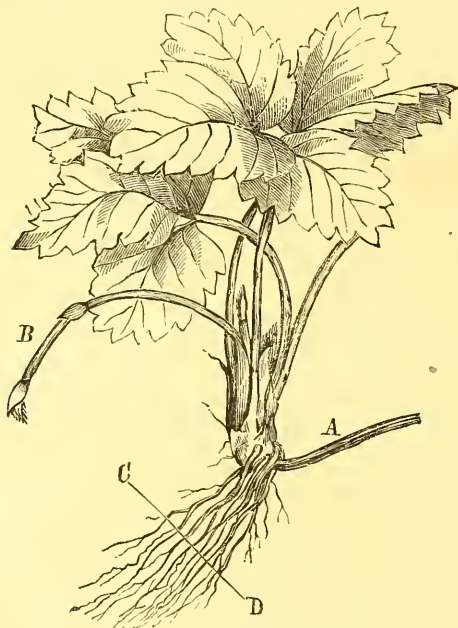


Fig. 19.—WHERE TO PRUNE ROOTS.

easily spread out at the time, which is quite important, because each root can produce rootlets without being entangled with others.

In transplanting in the autumn it is unnecessary to shorten the roots, unless they are so long that they cannot be conveniently planted entire. The roots of the Strawberry continue to grow from the extreme ends until cold weather, and when moved in fall or summer the roots

should be taken up entire, and carefully spread out when again placed in the soil. If the plants have been out of the ground long enough to cause the roots to have changed color and become dark and wilted, then they should be treated the same as those removed in spring.

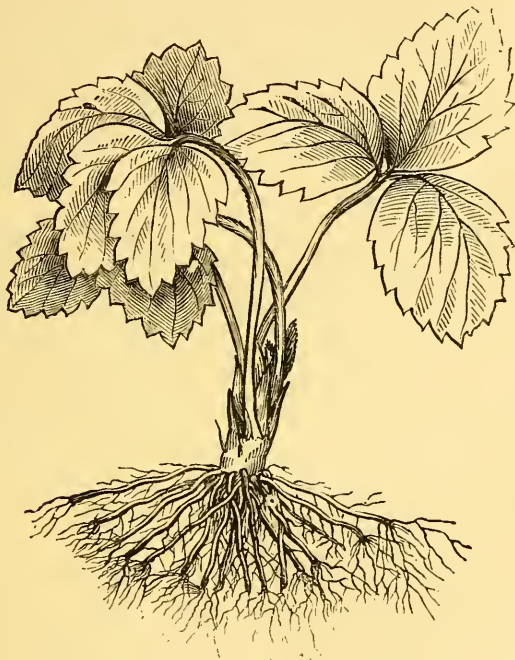


Fig. 20.—GROWTH OF PRUNED ROOTS.

All of the largest leaves should be cut off from plants when removed, leaving but two or three of the center leaves, as a plant is far more likely to live if only this number is allowed to remain on it than if none are removed.

We are now supposing that the plants are taken up without any soil adhering to the roots. If each plant is

moved with a ball of earth, then there will be no necessity for reducing the number of leaves, because the connection between the root and soil will not be broken, or, at least, not entirely separated; consequently they can continue to absorb moisture and nutriment for the support of all the leaves.

Sometimes it may be advisable to "puddle" the roots, as it is called, before planting. This operation is performed by mixing water with soil until it is of the consistency of thin mortar; then dip the roots into it, coating them with the mixture, which excludes the air and prevents wilting so long as it remains moist. A tenacious clay makes the best puddle, but it will sometimes adhere so closely to the roots as to become injurious. It is well to puddle, before packing, the roots of plants that are to be transported a long distance, and consequently be a long time on the journey. But the puddling should be washed off and the roots trimmed before planting again.

Roots that have been entirely excluded from the air for any considerable time are likely to become soured, and it is best to clean and refresh them with pure water before again placing them in the ground.

PLANTING AND CULTIVATION.

There is no one operation of more importance to the future success of a Strawberry bed than careful planting. Some cultivators plant with a dibble, making a small hole in which the roots are thrust, all crowded together in a mass. Plants may live under such treatment, but certainly cannot thrive so well as though their roots were carefully spread out in a natural position.

A common garden trowel should always be used, and a hole made in the soil large enough to admit the roots without crowding. Set the plants just so deep that all of the roots will be covered, and no deeper; for if the crown is buried it is very liable to decay, particularly in a

heavy soil. If a handful of very fine compost or manure is mixed with the soil around them at the time of planting it will very materially assist in their future growth.

It is always best to select a cloudy day for planting, if possible, but when only a few are to be set out they may be watered and shaded, and their growth insured without any regard to the weather. The distance between the plants will depend upon what kind of cultivation is to be given them. The oldest method of field culture in this country, and the one practiced upon thousands of acres in the Eastern States at the present time, is to plant in rows from two and a half to three feet apart, placing the plants about a foot distant in the rows.

The beds are hoed during the early part of summer, or until the runners cover the ground, after which no attention is paid to them until next spring. Then paths about a foot wide, and at a distance of four feet from each other, are made, thus forming beds with narrow paths, in which the pickers are expected to stand when gathering the fruit.

Two or three crops are gathered from these beds before any change is made or cultivation is given, except that of hoeing or plowing out the paths each season before picking time.

When the beds have become so much crowded with weeds and plants that the fruit is likely to entirely fail, a plow is run through the center of each bed, forming a new path, the runners being allowed to take root and fill up the old ones. Another crop or two is taken, and then the paths are again changed. Sometimes the beds are burned over in the fall after the weeds have died down and become dry; or a heavy harrow is drawn over them soon after the crop is gathered, tearing up the weeds and a greater part of the plants; while at the same time it breaks up the soil so that the few remaining plants will grow with more vigor, and there will be room for the new

runners to take root. In this manner the same beds are cropped for ten or fifteen years.

It is not the fancy improved varieties that are treated in this manner, but the older kinds, which are but a slight improvement upon the common wild berry. The foregoing method of cultivation is certainly not to be recommended, but I have mentioned it because there are probably as many acres of Strawberries grown and treated in this manner as are grown under any other system. Our eastern cities, particularly New York, Philadelphia and Baltimore, have been supplied almost entirely, until within a very few years past, from these half cultivated fields. We must conclude that such a method of cultivation is profitable; if not, it would have been abandoned long ago, although it is apparent that those who follow this system are not afflicted with the spirit of progress.

BIENNIAL SYSTEM.

Another method which has of late years become very popular is that of planting in beds, say two or three rows in each, placing the plants about eighteen inches apart each way, and then leave paths of about two feet. The plants are hoed and all weeds destroyed as they appear. The runners are all allowed to grow, and the entire surface is covered with plants, except a path of about two feet in width between the beds. These beds are allowed to produce two crops, and then the plants are plowed under and some other crop grown on the land for one or two seasons, when it is again planted with Strawberries, if desirable. This is probably one of the very best systems in vogue. The first crop is sometimes the best, but usually the second is considered as the main one.

It is much less trouble to plant a new bed than to clean the weeds out of an old one; besides, a first rate crop can

not be expected from a bed where the plants have become old and crowded.

A few Strawberry growers renew their beds by plowing up all but a small strip of about a foot wide, leaving one of these every four feet. Then, by passing a cultivator or harrow between these rows, the ground is leveled so that the new runners can readily take root.

ANNUAL SYSTEM.

This is one of the neatest systems in use, as weeds have no chance for getting a foothold, unless the cultivator is very negligent. The plants are put out in rows two to three feet apart, and about a foot apart in the row. They are carefully cultivated the first season, a crop taken the second, and then plowed under. To insure a full crop the soil must be made very rich, and the planting done in the fall or early spring, and in the most careful manner.

PLANTING IN ROWS OR HILLS.

There are but few varieties that succeed so well when restricted to hills for a number of years as when allowed to produce runners. The varieties of *F. grandiflora* are better adapted to this system than others, because they naturally produce large, compact plants.

The usual method is to plant in rows three feet apart, with plants a foot apart in the row. All runners are cut off as soon as they appear, and the beds frequently hoed, or kept clean with a cultivator. In the fall the entire surface is covered with a mulching of leaves, straw or coarse bog grass. The plants are covered as well as the ground between them. In spring the covering should be removed from the crowns of the plants, but left on between them, for the purpose of keeping the fruit clean and the ground moist. After the fruit has been gathered, sufficient mulching may be applied to keep down all weeds, or all of it

may be removed, and a plow passed between the rows to break up the soil, which will have become quite compact from being frequently traveled over in gathering the fruit.

New plants may be allowed to take root in the rows between the old stools, thus bringing them the second season into what is termed row culture. Some varieties will remain productive for several years under this treatment, but usually three or four years will be as long as they can be relied upon for a remunerative crop. I have practiced this system with many varieties, and believe that more fruit per acre can be produced (particularly with the foreign kinds) than by any other system. One strong stool, with plenty of room for its roots, and with the surface of the soil covered with mulching, will give more and larger fruit than twenty plants that are crowded, and upon an unprotected soil.

For general field culture, and with most of our native varieties, the biennial or annual system would probably be less troublesome and equally as profitable.

When pistillate varieties are grown they should be kept in separate beds, and every alternate one should be a perfect flowering variety, and one that blooms at the same time with the pistillate. This bed need not be more than half the width of the others.

GARDEN CULTURE.

The same systems recommended for field culture are equally applicable to the garden, but usually greater care will be given to a small bed than to a large one.

Water may be applied so that the plants shall never suffer for the want of it. Liquid manure should be applied, if very large fruit is desired, in addition to making the soil rich.

Different varieties may also be planted; for it is not the most profitable market fruit that is always of the best

quality. In fact, a very hard, firm berry, such as we would select for market purposes, is seldom so highly flavored as those which are more delicate.

By giving an abundance of water, with liquid manure, a second crop is often produced upon many of our common varieties. To insure a late crop, the first one must not be allowed to mature, but the flowers should be removed so soon as they appear in spring.

Then keep off all new runners, and give plenty of water, and a fine crop in August or September is almost certain.

The Boston Pine I have found to be one of the best varieties for producing a late crop when treated in this manner.

The monthly Alpines are excellent varieties for garden culture, although they do not produce very large fruit. Give them plenty of moisture and a rich soil, and there will be but few days from May to winter in which a dish of Strawberries may not be gathered from a bed of moderate size.

The Bush Alpines are less troublesome than those that produce runners.

This class of Strawberries vary but little when grown from seed, except that the fruit produced on the seedlings will be considerably larger for the first two or three crops than ever afterwards.

This peculiarity of the Alpines is well known in Europe, and the growers of these kinds always renew their beds with seedlings, and never depend upon the runners of old ones for making new beds or plantations. It is no uncommon thing to find berries an inch in diameter on young seedling plants of Alpines, while on old beds they will scarcely average more than one-half of this size.

The seeds may be saved and sown in the same manner as recommended for other kinds.

The amateur who only cultivates a few Strawberry plants in his garden will appreciate the fruit he grows in

his own grounds far above any market value ; therefore the cost of production is of very little importance, provided the results are satisfactory.

It is not to be expected that a man in moderate circumstances will continue to grow fruit which costs more than it is worth ; still there is a pleasure in producing extra fine fruit, even if there is no great profit in the operation. Besides, I am not quite sure that extra care and cultivation will not, as a rule, prove to be as profitable as that which is generally called good culture.

I have made several experiments for the purpose of thoroughly testing extra cultivation, most of which have been quite satisfactory.

A few years since I prepared a sixteenth of an acre by trenching it two feet deep, applying twelve large two horse loads of pure, well-rotted cow manure, thoroughly incorporating it with the soil to the depth of one foot.

I then planted this bed with the *Triomphe de Gand* Strawberry, placing the plants about two feet apart each way. A few runners were allowed to take root between the plants in the rows, but I removed all others. The ground was hoed often, and in winter the plants were protected with a coat of salt hay two inches in depth. The whole expense of preparing the bed-planting, hoeing and mulching up to the time of picking the first crop was fifty dollars. The bed yielded a little over four hundred quarts, which, at the low price of twenty-five cents per quart, would have given a fair profit. The next crop was fully equal to the first, and the expense incurred to produce it but very little in comparison to the first. This bed continued in bearing for five years, and even then the land was in good condition for any other crop. There are probably many soils that are naturally as rich as this bed was after being prepared, but in this instance it was imperatively necessary to enrich the ground to get even a moderate crop.

An abundance of moisture is one of the requisites for producing large fruit, and the amateur should not fail to see that his plants receive it, particularly at the time when the fruit is ripening. Mulching the beds is a sure method of keeping the soil moist, besides it prevents the fruit from getting splashed during violent showers. The short mowings of grass from a lawn make an excellent mulch, besides it looks very neat—much more so than straw or leaves.

In Europe a tile is sometimes used for the purpose of keeping the fruit clean, as well as for covering the soil and keeping it moist.

These tiles are about an inch and a half thick, and twelve inches square, and in two parts, as shown in figure 21. The hole in the center is about four inches in diameter. The plants are placed a foot apart in the rows, and before the fruit begins to ripen the tile is placed about them.

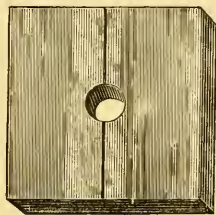


Fig. 21.—STRAWBERRY TILE.

If the rows are only a foot apart, then the whole surface will be covered, the soil will be kept moist, and the fruit clean. If water is required during the time of ripening, it can be applied directly to the plant by passing to the soil through the hole in the tile. These tiles could probably be obtained at any pottery or brickyard if ordered a few months in advance of the time they were wanted for use. It would be necessary to remove the tile after the fruiting season was over, and the soil should be worked over among the plants; if not it would become heavy and soured from being excluded from the air.

A newly patented article, answering a similar purpose, has just made its appearance in this country. It is called H. A. Fuller & Co.'s Patent Strawberry Vase, and is manufactured by the above-named firm at Norwich, Conn.

Figure 22 shows the form of the vase, with a plant growing within it. Not having tested this vase, I cannot recommend it from experience; yet it appears to be a good thing for the purpose designed.

The manufacturers claim that it protects the fruit from dirt and the vines from weeds, and that, by using it, double the amount of fruit will be produced on a given space than when the vines are cultivated in the ordinary method.



Fig. 22.—STRAWBERRY VASE.

The runners are kept trimmed close to the edge of the vase, thereby concentrating the strength of the plant, and larger and better fruit will necessarily be the result.

The flower stems will also grow much longer by being inclosed in the neck of the vase, while at the same time they will be supported by it, and the fruit will rest or hang over its upper part. The peculiar form of this vase will not only insure the reception by the plant of a greater part of the water that falls in the form of rain, but will make a direct application more convenient when applied artificially. When this vase is to be used the plants should be set one foot apart each way, leaving a path every four rows. The vases will touch each other, and shade the ground, with the exception of the paths, which may be covered with a mulch of saw-dust, tan or other material.

The present price, I am informed, for small quantities is twelve dollars per hundred; consequently they will scarcely be used by those who grow Strawberries for profit, unless the yield of fruit is increased in proportion to the outlay.

Nevertheless, all these peculiar contrivances are of interest to the amateur, besides, it was by improved methods of cultivation and extra care that our largest and best varieties were first produced.

Those old and long celebrated English varieties, Keen's Seedling and British Queen, were not produced from seeds gathered from neglected plants, but from those which had been stimulated by extra culture. And if we expect to keep on improving we must stimulate our plants into a vigorous growth—not only the ones from which we gather the seeds, but the seedlings themselves.

To produce large and extra fine specimens, only a few berries should be allowed to mature upon the plant. When there are several fruit stems, select three or four of the strongest, and destroy the others; also remove all except two or three berries from each.

Large Strawberries are quite the fashion at the present time, and the amateur cultivator generally takes the lead, merely because he applies the requisite means for producing the results.

A few years since an amateur Strawberry grower brought some monstrous fruit to an exhibition held in one of our eastern cities, and they were so much larger than anything that had heretofore been shown, that he was offered and accepted a very large price for the entire stock of this variety.

The purchaser sent his gardener for them soon after, and when he took up the plants he found the beds so filled with offal from a slaughter-house that the operation of removing the plants was anything but a pleasant one. Here were cause and effect but little separated. This is but one instance among the many that might be given to show that great results in fruit growing of any kind are only derived by direct effort on the part of the producer.

Old plants seldom produce as large berries as young ones, and a fresh stock should always be provided, either by allowing a few plants in the fruiting beds to throw out runners, or by setting a few in separate beds every year for that particular purpose.

Plants that have been highly stimulated will seldom

last more than two or three years, and they will frequently fail after producing one large crop. The safest plan is not to expect more than two crops, and to make the beds upon fresh soil, where no Strawberries have been grown for at least two seasons.

FORCING STRAWBERRIES.

The term *forcing* is generally used to indicate that a fruit is made to ripen at other than its season. In Europe the forcing of Strawberries has been extensively practiced for a long time, but in this country very little attention has been paid to this system of cultivation until within the past few years.

There are few plants that will grow more readily, or produce more fruit in proportion to the expense incurred, than the Strawberry when grown under glass.

When only a few plants are to be forced, and the object is merely to obtain fruit a few weeks in advance of the usual time, then a common hot bed may be used for the purpose. The plants, however, should be prepared the season previous, and stored where they can be had when wanted in early spring.

An ordinary green-house, such as is used for tender exotic plants, will answer the purpose. But one which has a roof so low down that the plants will be within two or three feet of the glass is better than one that is considerably higher; besides, it will take much less fire to heat a low house than a high one.

The soil in which the plants are to be grown should be exceedingly rich. A compost made of three-fourths old sods or turfy loam, and one-fourth barn-yard manure, will be found excellent for this purpose, and if there is considerable cow manure among the latter so much the better.

Mix these materials together, and let them become thoroughly decomposed before using. The more frequently

the compost is turned over, the less time it will require for its decomposition.

Leaf mold from the woods or friable muck, with a little addition of pure sand, will answer in the place of sods.

PREPARATION OF PLANTS.

When the first runners appear upon plants in the open ground, fill as many three inch pots with the compost as you desire, and set them near the old plants from which you wish to take those for forcing, placing the top of the pot just level with the surface of the soil. When the young plants on the runners begin to show roots, place one on the soil in each pot, and lay a stone or a little soil on the runner to keep it in its place.

The end of the runner should be pinched off just beyond the plant, so that it will receive all the nutriment furnished by the parent. When the young plant has become rooted in the pot, it should be taken up and the runner cut off close to the plant; then set the pots away in an open and airy place for a few weeks, being careful not to let them suffer for the want of water. Set them on flat stones, bricks or boards, so that no worms can have access to the pots through the hole in the bottom.

When the plants have remained in the pots a few weeks, they should be shifted into larger ones. Some prefer to place them in five-inch pots, and afterwards shift into six or eight-inch pots, in which they are to be fruited, while others make but one shift from the small pots. It will make but little difference, as either plan will work well if carefully done. The ball of earth containing the roots should not be broken when re-potting, but preserved whole. A few pieces of broken pots or brick should be placed in the bottom of these large pots for drainage.

There are a few gardeners who assume that drainage is of no importance, but from my own experience of several

years with a great variety of plants, I cannot indorse this new theory of no drainage, particularly when the plants grown in pots naturally succeed best in a soil that is deep and moderately dry. With the small pots, drainage is of little importance, but with those of larger size all surplus moisture should be allowed to pass through, leaving only what will usually be retained by the soil.

The plants, after they have been placed in the large pots, may be set close together, or plunged up to the rim of the pot in the open ground until wanted, care being given to keep them growing vigorously until within a few weeks of the time they are to be placed in the forcing-house. Water should be gradually withheld, so that the plants may ripen. It is not advisable to withhold water entirely, but give only enough to keep the plants from actually suffering for the want of it, and allow them a short period of rest before starting them again into growth. If runners should appear they must be pinched off. Those wanted for an early crop may be placed in the house the first of November, as it will be ten to fourteen weeks from the time the plants are placed in the forcing-house before the fruit will be ripe.

If a succession of crops is desired, then only a portion of the plants should be placed in the house at one time.

The pots may be set on shelves or plunged in soil—the latter method is preferable, as there is less danger of the plants being affected by careless watering or change of temperature.

The plants should now be watered regularly, just enough to keep the soil moist, but not wet—the temperature of the house raised to 65 or 75 degrees in the day, and 50 to 60 at night, slightly increasing as the flower stems appear.

The plants should be frequently, say every alternate day, syringed or sprinkled overhead until they bloom, then omit it until the fruit is set, after which it may be continued, but not quite so often as before. While the

plants are in bloom, as much air should be admitted as possible without lowering the temperature or allowing a direct current to strike upon the plants. In clear weather the plants will generally require water once a day, and sometimes twice. Care should be observed not to let the leaves wilt, but do not give so much water that the soil shall become sodden and heavy.

A few applications of liquid manure may be beneficial, provided the compost used is not sufficiently rich. When the fruit is set and swelling, is a good time to apply it, but withhold it after the fruit begins to ripen.

The reserved plants should be stored where they will not be frozen. A light, warm cellar or walled pit, covered with glass, will answer the purpose—a place where they will receive light, and not be frozen, yet so cool that they will not be excited into growth. Sometimes plants a year old are taken up in the fall and potted, and used for forcing, but those prepared as described are preferable. Forcing houses are sometimes so arranged that the plants are set directly in the ground without pots. A more vigorous growth of plant is secured by this method, but it is doubtful if the crop of fruit is increased.

Plants that have been once used for forcing should be discarded and not used for the same purpose again. It may be advisable, in cases of scarcity, to plant them out in the open ground in spring, for they will occasionally produce a moderate crop late in the season.

All the different operations may be varied to suit the circumstances of the case, as in open air culture; and I have only endeavored to give a general plan, omitting minute details, which the grower will readily supply while the operation is in progress. At every step caution and a due amount of thought are requisite—such as preventing cold currents of air striking the plants

when in bloom, or chilling the roots by applying very cold water.

Forcing Strawberries for market is not a common practice, except near our larger cities; but it will probably become more general in a few years than at present, particularly if two to three dollars per quart can be obtained for the fruit, as has been done in New York for several years past.

FORCING HOUSES.

Few, if any, structures have been built in this country expressly for the purpose of forcing Strawberries.

The common lean-to or span-roof houses are principally used for forcing all kinds of fruits, and perhaps they

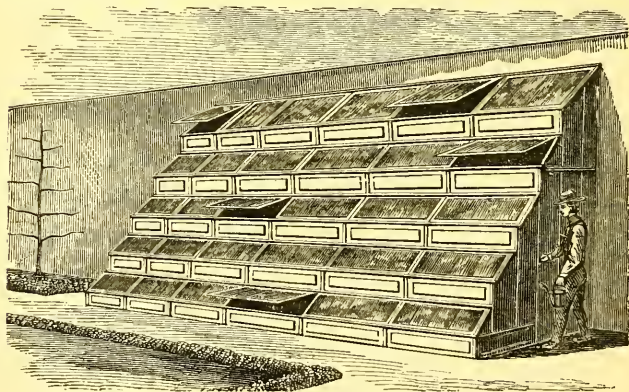


Fig. 23.—FORCING HOUSE.

answer as well as any other. In Europe many different styles are in use, among which there is probably none more unique or better adapted to forcing the Strawberry than the one shown in the accompanying engraving, figure 23. This is a lean-to house, but instead of the usual form of roof it is made up of a series of short frames, one above the other, like a flight of stairs. These frames rest

upon cast iron brackets, fixed against the wall or upon standards erected for the purpose. Where the brackets are fastened directly upon the wall, access is had to the plants by lifting the frames from the front. But the one shown is wide enough to allow a passage behind the frames. The idea is a good one, which our own gardeners will not fail to take advantage of. The plants in the frames are brought close to the glass, and there is no extra or waste space, which requires just as much heat as that which is occupied by plants. This style of house is said to have originated with the firm of Weeks & Co., Chelsea, England. Three different plans of these English houses were given in the *Gardeners' Monthly*, in June, 1865. They may be heated with hot water, steam, or any of the other modes usually employed.

VARIETIES FOR FORCING.

Comparatively few experiments have been made in this country in forcing Strawberries; it is, therefore, not known which are the best varieties for that purpose. None but those with bi-sexual flowers can be used advantageously, inasmuch as in the still atmosphere of a house the pistillate varieties would be imperfectly fertilized, even if abundant perfect flowering kinds were grown among them.

Forced fruit is not generally as highly flavored as that which ripens in the open air; consequently only that of the best quality should be used, provided flavor is an object.

Trollope's Victoria is a fine show fruit, and produces well when forced, but it is usually insipid.

Austin or Shaker, is equal if not superior to the last, but with the same defect, although not to such an extent. Its fine color and large size are very much in its favor and it usually commands a large price in market.

The British Queen is the most popular variety in Eng

land for forcing, and it would probably be worthy of trial here, although it does not succeed very well in the open air.

Among our native varieties we have probably no better variety for forcing, taking flavor and productiveness into consideration, than the Boston Pine. The monthly Alpines do exceedingly well, and the fruit is usually considerably larger than when grown in the open ground.

THINNING THE FRUIT.

It is sometimes necessary to take off a portion of the fruit from forced plants. This should be done as soon as it has set, thereby giving that which remains a better chance for full development. Numbers do not always indicate quantity, and, with ten to fifteen berries upon each plant, as many quarts will usually be obtained from a given space as with twice as many to each.

Plants that are not over-cropped at first, may often be made to produce a second crop by giving stimulating manure soon after the first is gathered.

One crop, however, is all that is usually expected with those which do not produce any more naturally.

HYBRIDIZING AND CROSSING.

The Strawberry may be hybridized or crossed as readily as other fruits, but this having already been done to such an extent between the *F. Virginiana* and *F. grandiflora*, the results of special effort in the same direction will be very uncertain, especially if we use the varieties under cultivation for that purpose.

These being in many instances a mixture of two species, it becomes a difficult matter to determine whether the cause which produced certain results originated with us, or was the effect of some previous operation which had just made itself apparent in the seedlings.

In other words, hybridizing *hybrids* is only the mixing together of two compounds—the exact proportions of neither being known.

The pistillate varieties are always fertilized by other kinds; their seeds are impregnated by whatever kind produces the pollen; consequently the plants grown from them are natural crosses between the two or more, as the case be.

It is very doubtful if any dependence can be placed upon the results of artificial crossing between any of the varieties of the two species named; still, it may be worthy of trial. All that is required is to fertilize the pistils of one variety with the pollen from another.

For instance, if we select the Wilson's Albany for the parent from which we wish to procure seeds, when the flowers *first* open, we take a pair of small scissors and cut off the stamens, being careful to remove every one. It is best to do this early in the morning before the petals have fully expanded; then set a bell-glass or a fine wire screen over the entire plant, so that insects, which go from flower to flower with pollen adhering to them, shall not fertilize the plant upon which we are operating and thereby defeat our object. In three or four hours after the stamens have been removed, the pistils will probably be sufficiently developed to receive the pollen, at which time cut a fully expanded flower from the variety that has been selected for the other parent, and apply its stamens to the pistils of the Wilson's Albany. The stamens may be cut off and allowed to drop on to the pistils or merely brushed over them. Three or four flowers are sufficient, and all that it is safe to undertake to operate upon on a single plant; all others should be removed before they open.

Each flower must have its stamens removed and its pistils fertilized in the same manner; and as they will probably not all open in one day, they must be attended to successively as they bloom.

Mark the plants, and keep the screen or bell-glass over them for two or three days. When the seeds are ripe, save and plant as I have already directed.

There are a few Strawberry growers who place great reliance upon their particular efforts in crossing, and whenever they produce a new variety it is always (if we believe their assertions) a cross or hybrid between some two remarkable varieties or species. But to show how exceedingly difficult it is to know positively whether a seedling is a cross between the two varieties upon which we have experimented, or the result of some previous one, let us suppose a case.

For instance, we will take Hovey's Seedling and fertilize it with the Wilson, and from the seed of the former raise a variety that shall resemble the latter more than it does the Hovey—would this be positive proof that the seedling was the result of our especial effort? Not at all, because similar varieties may be and are produced from the Hovey without artificially fertilizing its flowers from the Wilson or any similar variety.

And further, the Wilson is probably a seedling of the Hovey, and it possesses naturally the same inherent characteristics which only require an opportunity, which seedlings afford, to show themselves.

Direct efforts to improve are commendable, but the causes of results are not always what are supposed, and assertions are not to be implicitly relied upon. The influence that one variety has upon another by fertilizing is generally supposed to affect the seeds only, but from many experiments which I have made, I am quite certain that it extends further.

Every Strawberry grower is aware of the fact that whenever a portion of the pistils are not fertilized, the berries will be proportionately deformed. If there are no seeds, then the receptacle, which we call the fruit, is abortive. But if we are to suppose that the influence of the

pollen extends no further than the seeds, why does not the fruit enlarge and come to maturity without seeds, as we see in other fruits, particularly those which produce their seeds within a fleshy receptacle, as the grape, apple, &c.

With corn, we can see the effects of cross-fertilization in the color of the grains the first season, also upon the receptacle (cob); thus, in this instance, showing conclusively that the effect is apparent the first season upon the seed as well as beyond.

It is quite probable that impregnation affects the whole plant, but not to an extent worthy of any particular attention. Still, from personal observations upon this point, I am well satisfied that principles similar to those which govern the animal kingdom are potent in the vegetable. Because they are not so readily observed is no reason for disputing their effect.

The most careful experimenter or observer is generally less positive in his assertions than the more careless, because by thorough study he learns that although cause and effect are linked together, the connecting chain is often not only hidden, but has so many ramifications that each cannot be traced with any degree of certainty.

In giving names to new varieties errors are occasionally made—sometimes purposely, and with intent to deceive, but let us hope more often carelessly or through ignorance. Many of my readers may remember the advent of Peabody's Hautbois Strawberry.

The originator claimed that it was a cross between the Ross and Phœnix and the wild Strawberry of Alabama, neither of which belong to the Hautbois species; consequently it was a deception to call the new seedling a Hautbois, although the originator had, according to custom, a right to give it whatever name he pleased.

Many other so-called Hautbois Strawberries have been as far from what their name implies as the Peabody, and

may have been applied through ignorance or design. It is very doubtful if there have ever been any true hybrids produced between the Hautbois, or the Alpine, and other species. Some fifty years ago, a Mr. Williams, of Pitmas-ton, in England, claimed to have produced a hybrid between the Hautbois and Alpine, which gave fruit without seed, but nothing more was heard of it beyond the announcement of its production.

Whether hybrids between the Alpines and Hautbois, or these and other species, have ever been produced is uncertain; yet I think it possible and worthy of trial.

WINTER PROTECTION.

In many portions of the country a winter protection to Strawberry plants is very beneficial, if not positively necessary. Some of our most successful growers in the Northern States never fail to protect their plants, and without doubt they are amply repaid for the expense incurred. For my own part I never have had a full crop without giving protection, and never expect one.

There can scarcely be a doubt that the great success of some cultivators, with particular kinds, is owing, in a great measure, if not entirely, to the winter protection of the plants.

The embryo fruit buds are formed within the crown of the plant in autumn, and therefore it must be apparent that sudden transition from heat to severe cold will very much weaken if not wholly destroy them.

In sections of the country where the plants are covered with snow during the entire winter, other protection is not so important as where there is little snow, but continued freezing and thawing. It is not expected nor is it desirable to protect the plants so that they shall not be frozen, but merely to shade them, and prevent their being affected by every little change in the weather.

A covering of straw, hay, leaves, or any similar mate-

rial, to the depth of one or two inches will usually be sufficient.

Every one ought to know, if he does not, that frozen plants thawed out in the shade are less injured by frost than when fully exposed to the light; and this is another reason why Strawberry plants should be covered in winter, because, if the weather should be very changeable, they will be less liable to injury than when fully exposed to light.

Protection is sometimes objected to, because it is said to retard the blooming of the plants, and the crop will be later in ripening. This may be true to a certain extent, but I have always thought that protected plants came forward more rapidly, when they did start, than the unprotected ones. The lost time may not be fully made up, but there will be but a very slight difference.

In some sections of the country, retarding the time of blooming would be very advantageous, as by this means the injury from late spring frosts would be avoided. The benefit of having late blooming kinds was quite apparent the past season, (1866), when a late frost was very destructive through a great portion of the Northern and Middle States; and the reports of the Strawberry crop furnished some amusing illustrations of the careless manner in which some cultivators arrive at conclusions. The early blooming varieties came in for all the censure, while the late bloomers, which escaped the frost, received all the praise; and still, with this very potent fact before him, scarcely a fruit grower, in making up his report of success or failure, alluded to the time of the blooming of the variety cultivated. The varieties of *F. grandiflora* in particular, require winter protection to insure a full crop. The large, prominent crowns of these varieties are more liable to injury than the smaller and more compact ones of those of other species. When the plants are grown in beds, then a portion of the material used for protection

should be removed in spring, leaving about half an inch in depth, allowing the plants to grow through it, thereby affording a mulching that will keep the fruit clean as well as shading the ground.

Saw-dust and tan-bark are sometimes used for mulching, but there is usually so much fine dust among them that the fruit will become more or less splashed during heavy rains.

Spent hops from a brewery is a most excellent material for mulching the Strawberry; besides, few insects will attack the plants or fruit where it is used. The young runners strike root very readily in spent hops, showing that it is an excellent fertilizer. Fallen pine leaves are found to be very good, as they keep the fruit clean, while at the same time they will have decayed so much as to interfere but very little with the growth of the plants. Some have suggested that the peculiar flavor of the Pine varieties is imparted to others by the use of this kind of mulching, but this is probably more in imagination than in reality.

Salt meadow and bog hay are excellent for a mulch, as also is straw or corn stalks cut fine.

When the plants are cultivated in rows, the mulching should only be removed from the crowns of the plants, and the entire amount allowed to remain on the ground between the rows.

Another method of protecting the plants is to cover them with soil. This is done by passing the plow along each side of the row, turning the soil on the plants in the fall, and then removing it again in the spring. This plan might answer in light soils, but then a mulching would be still needed in summer to keep the fruit clean. This method has been practiced in a few places, but with what success I am unable to state.

DISEASES AND INSECTS.

The Strawberry is peculiarly exempt from diseases, there being few which affect it to any considerable extent.

Sometimes a sudden change of weather will cause the flowers to blight, and no fruit will be produced ; but this cannot be classed as a disease, but merely as an accidental cause of failure. In warm, wet weather, the fruit and leaf-stalks will be affected by mildew, and the leaves attacked by a kind of rust which is called in Europe Strawberry Brand (*Aregma obtusatum*). Mr. Cooke, in his late work on Microscopic Fungi, has given a description and highly magnified illustration of this species, which we quote, figure 24. The

spores are produced in clusters on the upper side of the leaves, and appear to the naked eye like minute yellow spots, but under a magnifying lens they have the form shown in the illustration, figure



Fig. 24.—STRAWBERRY BRAND.

24. As this fungus makes its appearance late in the season, it causes but very little injury.

A kind of blight or rust is reported to have appeared on Strawberry plants in some of the Western States during the past few years, causing considerable loss to growers of this fruit, but as I have had no opportunity of personally examining the affected plantations, I am unable to express an opinion as to the cause or nature of the disease. In most cases of fungus diseases, dusting the plants with ashes or gypsum will be beneficial, even if it does not entirely destroy the fungi causing them.

Insects are more injurious to the Strawberry than are diseases, and among the most destructive of these are the various species of the May Beetles (*Lachnosterna*), of

which there are over sixty species already described as inhabiting the United States, and there are probably others not as yet discovered by our entomologists. There is no locality, from Washington Territory to Florida, in which one or more species of May Beetles do not abound, and the larvæ or grubs of all are destructive to the roots of various plants, and especially those of the Strawberry. These grubs, when fully grown, are from an inch to an inch and a half long, of a whitish color, and with brown heads. They are commonly known



Fig. 25.—MAY BEETLE.

as White Grubs, without regard to species. The most abundant in the Eastern States is *Lachnosterna fusca* of Frölich, a large brownish beetle, figure 25, which usually appears about the first of May, or a little later, hence the common name.

There are also several other species, more or less abundant, and appearing at the same time, but as all are similar in habits, they may be considered as one.

These grubs are usually more numerous in old dry pastures and meadows than elsewhere, because their principal food is the roots of different kinds of grass. The old sods afford protection against the birds and animals which devour them; consequently they often become very abundant in such places. If these grass lands are plowed and planted with the Strawberry, the grubs will attack the roots, and, if numerous, will destroy every plant almost as soon as it is put in the ground. In some sections of the country the white grub has very materially checked the cultivation of the Strawberry. The only remedy with which I am acquainted is, to occupy the ground with some crop which requires considerable hoeing and cultivation, for two or three years before planting with the Strawberry.

The grub is three or four years in attaining its growth,

and by continually manipulating the soil they are exposed to the attacks of birds, and many are destroyed by crushing ; besides this, the Beetles will seldom deposit their eggs in freshly disturbed soil. As all the May Beetles are nocturnal in habit, many may be taken by using tubs of water with a floating light in the center. A few hundred taken every evening during the first few weeks of summer will do something toward diminishing the number of the succeeding generations in a neighborhood, but the birds and domestic fowls are the Strawberry grower's most efficient helpers in the way of destroying May Beetles and White Grubs. The grubs are greedily devoured by birds ; the Crow being exceedingly fond of them. This much abused bird will always seek them on recently plowed ground, where, I regret to say, many a Crow has lost his life while devouring the White Grub ; he was benefiting the cultivator, who returned his kindness with a death-dealing bullet. From a pretty intimate acquaintance with the habits of the Crow, having kept several tame ones, I am well satisfied that they are far more beneficial than injurious to the farmer. A crow will eat a hundred white grubs in a day, after he has had a breakfast of an equal number of rose bugs. I do not state this as an imaginary case, but as a simple fact that I have proved many times. From experience, I firmly believe that the Crow is one of the most useful birds that we possess, although he does a little mischief now and then in the way of pulling up corn. When domesticated he forgets those tricks of his wild nature, and, not being a timid bird, he is not frightened by hoe or spade, but when the earth is turned over he is generally there to see and do his duty.

At the time of writing this book, my strawberry beds and those of my neighbors had suffered more or less by a small green worm, at that time unknown to me or to any entomologist of my acquaintance. This insect was quite

destructive to the leaves of the plants, frequently stripping a plantation of its foliage in a few days. I have since ascertained that these worms are the larvæ of the *Emphytus maculatus* of Norton, a small black fly, figure 26. This worm has received the common name of "Strawberry Worm," and appears to have become abundant throughout the Northern States, and really more destructive to strawberry plantations in the West than at the East. Prof. Riley figured and described this insect in vol. 1, page 90, of the American Entomologist. The worms are of a yellowish-green color, a little over a half inch long, and when feeding are usually curled up, with the extremity of the body hanging down, as shown

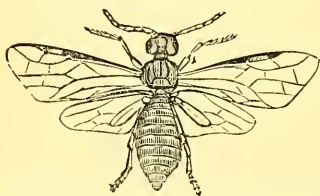


Fig. 26.—FLY OF THE STRAWBERRY WORM—ENLARGED.

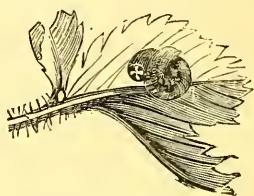
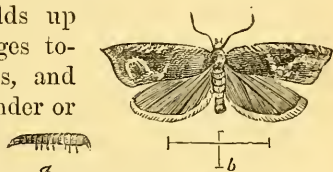


Fig. 27.—STRAWBERRY WORM.

in figure 27. The parent fly appears in our Northern States early in May, and, as I have said, is of a black color, with two rows of transverse whitish spots upon the abdomen. The female deposits her eggs in the leaf stalks, first puncturing them by means of a saw-like instrument with which she is provided, and thrusting her eggs into the wounds thus made. The eggs hatch in a few days, and the young grubs immediately attack the leaves. When fully grown they descend into the ground, roll themselves up in a slender cocoon, the pupa remaining within until the following spring. Dusting the leaves with lime, when wet with dew, or just after a shower, is the best method with which I am acquainted for destroying the pest.

Another leaf enemy of the Strawberry is known as the "Strawberry Leaf-roller" (*Anchylopera fragariæ*, Walsh and Riley), of which figure 28, *a*, gives the larva of natural size, and *b*, the moth, enlarged. This insect, like the last, appears to be more abundant at the West than eastward. Still I have frequently found it on the plants in my garden, and I presume it is not uncommon in strawberry plantations throughout the country, but only noticed when so abundant as to strip the plants of their leaves. In feeding, it folds up the leaves, drawing the edges together with silken threads, and then eats out the more tender or pulpy parts. Prof. Riley states that there are two



a, Larva ; *b*, Moth.

Fig. 28.—STRAWBERRY LEAF-ROLLER.

of the first brood passing through their transformation on the leaves, the moths appearing about the first of July. The female moths deposit their eggs on the leaves, where they soon hatch, and the worms commence their work ; but those of the second brood, when coming to maturity late in the fall, descend into the ground, change to pupæ, and remain in this state until the following spring. Owing to the habit these worms have of rolling themselves up in the leaves, they are somewhat protected from destruction by any dry or liquid application that may be made to the plants for the purpose. Sweeping the leaves with a broom will disturb and destroy a few of the worms, but the most rapid method of destruction is burning off the leaves after the fruit is gathered, or passing a heavy roller over the plants in time to destroy the second or late brood in autumn.

The Strawberry Crown Borer (*Tyloderma fragariæ*, Riley), is another pest of the Strawberry, more or less abundant in the Western States and Canada, but I have

not as yet discovered it in my own grounds, or those of my neighbors. It is a small Snout-beetle, a veritable Curculio, about an eighth of an inch long and half as broad, and ornamented on the back as shown in figure 29, which is an enlarged portrait of this pest. The grubs of this beetle bore into the crowns of the plants, as its common name indicates, where they destroy the embryo fruit-stalks and leaves. The only remedy proposed is to plow up the infested plantations soon after gathering the fruit in summer, while the grubs are still in the crowns of the plants.



Fig. 29. STRAWBERRY CROWN BORER.

The Snail or Slug which is so abundant and destructive to the Strawberry and other garden products in Europe, has found its way to this country, and is now quite plentiful in some gardens near New York. These snails are great gourmands, and will destroy the fruit in quantities if they become very plentiful. Hand picking, or destroying them with lime, is a pretty sure way of getting rid of this pest.

The Plant Louse (Aphis), or Green Fly, as it is usually called, sometimes becomes numerous upon the roots of the Strawberry, particularly when the soil is quite loose and open, so as to admit them readily to the roots, upon which they congregate in immense numbers, sucking the juices of the plant, and thereby effectually checking its growth. A liberal application of dry ashes or refuse from a tobacco factory will usually destroy them. The Aphis also attacks the plants grown under glass, but they are more readily destroyed than the Red Spider (*Tetranychus telarius*), which insect is often very injurious.

The best preventive of the ravages of the Red Spider is a moist atmosphere, but when this cannot be allowed, flowers of sulphur should be freely scattered among the plants or upon the soil near them. The fumes of melted

sulphur will make quick work with them, but it requires great care in its application, for should the sulphur take fire and burn, the fumes will destroy the plants also.

Birds are, in some portions of the country, very destructive to the Strawberry, but I forbear to suggest a remedy, because there are already too many effectual ones in use.

VARIETIES.

In the following catalogue I have endeavored to give the names, with a concise description, of all the varieties now in cultivation, which are worthy of it.

To give a full description of all known varieties would require a volume by itself, and it is very doubtful if, when such a list was made, any one would take the trouble to peruse it. It is such an easy matter to raise new varieties, that a few men seem to have gone into the business, not for the purpose of improvement, but mainly to see how many varieties they could produce, and so they name each new seedling, and give it a glowing description, whether it is worthy of cultivation or not.

Now, while I would not suppress any information that would benefit the public, I do not feel called upon to recommend or give the names of all varieties that have appeared in the catalogues of some few of our Strawberry growers, especially of those who appear to always have ready, if we were to believe them, some wonderful variety for every annual edition of their catalogues.

Our enterprising fruit growers are supposed to know and procure the best varieties, and when one has been before the public for from five to ten years, and then it is not found in general cultivation, it may be safe to conclude that the fruit grower lacks confidence in the originator, and consequently does not purchase it, or that it has been tried and discarded. The reader, if he has followed me through the preceding pages, will have noticed that

I recognize among cultivated varieties but two sexes, viz. : Perfect or Bi-sexual, and the Pistillate varieties. The latter kinds are marked *pistillate* ; all not so designated are *perfect*, and will bear fruit without the aid of others to fertilize them.

DESCRIPTION OF VARIETIES.

The following are varieties of *Fragaria grandiflora* and *F. Virginiana*. Some of them show more of the peculiar characteristics of one species than of the other, while with a few it would be difficult to tell to which they were related, and it is very probable that they are a mixture of both. They were all produced in this country, and are called native varieties :

Agriculturist.—Very large, irregular, conical, with long neck, large specimens often flattened or coxcomb shaped ; color light reddish crimson ; flesh deep red, moderately firm, sweet, rich and good ; plant a very strong grower ; leaves large, thick, dark green, with reddish petiole ; hardy and productive, and succeeds remarkably well on light sandy soils, as well as on those that are heavy. A valuable variety. Figure 30 shows a fruit of medium size in ordinary field culture. Originated with Seth Boyden, Newark, N. J.

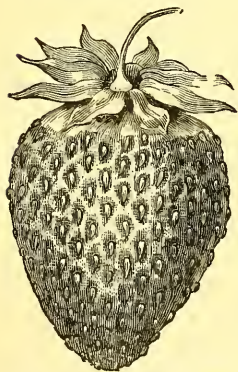


Fig. 30.—AGRICULTURIST.

Austin or Shaker.—Superseded by better sorts. Originated among the Shakers at Watervliet, N. Y.

Albion White.—See Lennig's White.

Belle.—A new variety, which originated with J. B. Moore. I have not seen it, and only know of it by re-

ports of Massachusetts Horticultural Society, where it is referred to as "very large," or as "the largest Strawberry ever exhibited on the Society's tables."

Bidwell.—Very large, conical; bright scarlet; flesh firm; quality excellent. A vigorous grower and plants are reported to be very productive. A new variety not fully tested.

Black Defiance.—Large, irregular in shape; dark glossy crimson; flesh moderately firm; high-flavored. Only moderately productive. The color is objectionable, as the berries, soon after gathering, assume a dull, stale appearance. Originated with E. W. Durand.

Boston Pine (*Bartlett*.)—Medium to large, obtuse-conical; color light crimson; flesh but slightly colored, firm, sweet, most excellent; fruit stalks very long; plant vigorous and productive; a fine market variety; ripens early; succeeds in both light and heavy soils, and is very hardy. Originated with C. M. Hovey, Boston, Mass.

Brighton Pine.—Medium to large, roundish-conical, with short neck; color light crimson; flesh rather soft, sweet and juicy; plant strong, vigorous and moderately productive; early. Originated with Mr. T. Scott, of Brighton, Mass.

Burr's New Pine.—Once a very celebrated variety, but is now seldom seen in cultivation. Originated with Mr. Burr, Columbus, Ohio.

Buffalo.—See McAvoy's Superior.

Brooklyn Scarlet.—Medium to large, regular, conical, with neck; color bright scarlet; flesh rather soft, sweet and rich; quality best; plant a dwarf grower, producing very large stools, hardy, vigorous and productive; one of the best for home use. Originated with A. S. Fuller, in 1859, from seed of Peabody Seedling. One of the three "New York Tribune" prize varieties.

Baltimore Scarlet.—See Scotch Runner.

Captain Jack.—Medium or small, regular, short conical; bright scarlet; flesh pink, firm; poor in quality. A vigorous and productive variety, more highly prized at the West than at the East. Originated with Samuel Miller, Bluffton, Mo.

Caroline.—Large, conical; bright scarlet; quality good; plants rather feeble, and only moderately productive. Not fully tested. Originated with J. B. Moore, Concord, Mass.

Centennial Favorite.—One of Mr. Durand's seedlings, of large size, irregular shape, but scarcely possessing sufficient merit to entitle it to a prominent position among better and more prolific sorts.

Champion. (*Windsor Chief*.)—Large, round; bright crimson; flesh rather soft; inferior in quality, but the plants are so vigorous and productive that this is considered a very profitable market variety; pistillate. Originated with Dr. J. C. Neff, Carlisle, Pa.

Charles Downing.—Medium to large, round, obtuse-conical; very regular in form; bright scarlet, becoming darker when fully ripe; flesh moderately firm, pink, juicy, with a rich, sprightly sub-acid flavor. One of the very best varieties in cultivation. The plants are vigorous, wonderfully productive, and succeed admirably on light soils, and bear profusely even in thick matted beds. Originated with the late J. S. Downer, of Fairview, Ky., and named in honor of the Veteran Pomologist of Newburgh, N. Y.

Cinderella.—Large, conical; bright scarlet, glossy; moderately firm; of second-rate flavor. Plants only moderately productive. A handsome and attractive variety. Originated with Oscar Felton, of New Jersey, who has also raised several other sorts.

Col. Cheney.—Small, long-conical; bright scarlet; flesh soft, watery, poor flavor; plants vigorous and productive. A poor thing at best, although it has been highly praised by certain dealers who were anxious to sell plants. Pistillate.

Col. Ellsworth.—Superseded by better sorts. Discarded, because unproductive.

Continental.—A large, dark crimson berry; said to be of good flavor and the plants very productive. I give this only on hearsay evidence, not having seen the plants growing.

Crescent Seedling. (Figure 31.)—Medium to large, somewhat irregular conical; bright scarlet; flesh rather soft for a market berry, but will do for short distances, or when carefully handled; quality fair, not rich; the plants, however, are of such a vigorous growth and so productive that this variety has become quite a favorite among cultivators for market. Originated with Mr. William Parmelee, New Haven, Conn. This is quite a different berry from the old and long since discarded "Crescent Seedling," which originated at the South.

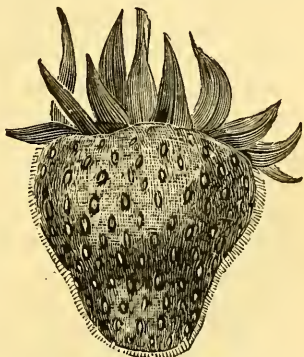


Fig. 31.—CRESCENT.

Crimson Cone. (*Pine Apple, Scotch Runner, etc.*)—Medium, regular, conical, with long neck; seeds deeply imbedded; color light, bright crimson; flesh firm, sprightly acid, with a rich flavor, and highly perfumed. Figure 32 shows a fruit of the usual size. One of the best Strawberries in cultivation, although too small and acid to suit some people. This is one of the old market

kinds, and there are probably more acres of it in cultivation for furnishing the New York market, than of all others put together. The flowers are perfect, and not

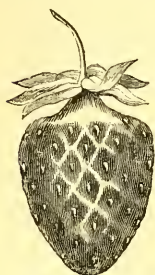


Fig. 32.—CRIMSON
CONE.

pistillate, as has often been asserted. There is, however, another variety which is generally found mixed with it, and also called Scotch Runner, which has pistillate flowers. The latter variety is the true Scotch Runner, for which see description.

Crystal City.—A new Western variety; handsome bright scarlet, but very indifferent in quality. I have no information in regard to its origin or value, except some brief notices which have appeared in western papers, and in a few catalogues. Said to be very early.

Cumberland Triumph.—Large, smooth, and uniform in shape; light bright scarlet; flesh pale pink, soft, but of good flavor. A very handsome, vigorous grower; the leaves deep glossy green, quite distinct. Requires a strong fertile soil. A valuable variety for amateurs, or for home use, but too soft for market. Originated with Mr. Amos Miller, Carlisle, Pa.

Damask Beauty.—The only reference to this variety we have seen is by E. P. Roe, who says it is “a very distinct variety and interesting to amateurs, but of no great value.” But just why it is “interesting” we are not informed.

Downer's Prolific.—Medium to large, globular, light scarlet; seeds deeply imbedded; flesh rather soft, acid, not rich, but highly perfumed; very early, hardy, and wonderfully prolific. An excellent old market variety, provided the market is near by. Originated with J. S. Downer, Fairview, Kentucky.

Duchess.—Large, roundish, uniform; bright scarlet;

flesh pink, moderately firm, good flavor, but not best; ripens early; plants vigorous, and very hardy and productive. This variety has an excellent reputation among those who raise fruit for market. Originated with D. H. Barnes, Poughkeepsie, N. Y.

Duncan.—Medium, slightly conical, although often quite variable in form and size; bright scarlet; firm, excellent flavor. A productive and valuable market berry. Originated with J. G. Lucas, Ulster Co., N. Y.

Durand's Seedling.—Large, oblong, or oblong-conical, sometimes flattened; seeds but slightly sunken; color scarlet; flesh firm, solid, nearly white, of good flavor.

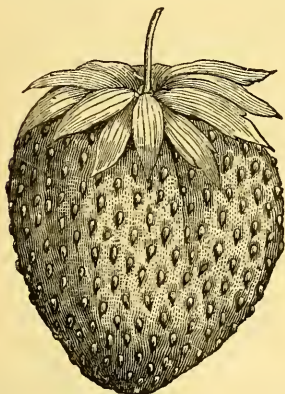


Fig. 33.—DURAND.

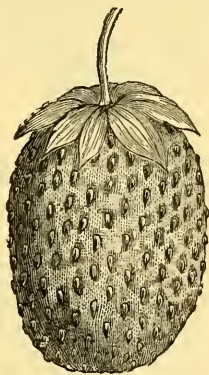


Fig. 34.—DURAND.

Originated with Mr. F. W. Durand, near Irvington, N. J. Figures 33 and 34 give a fair representation of two of the berries, showing its variableness in form.

Early Scarlet.—Medium, conical; light scarlet; flesh firm, moderately acid. An old variety, but little cultivated at the present time.

Fillmore.—Large, obtuse-conical; dark crimson; sweet,

moderately rich and good. In deep, rich soils this variety produces a fair crop, but it is not generally popular among fruit growers. Pistillate. Originated with Samuel Feast, Baltimore, Md.

Forest Rose.—Large, irregular, obtuse-conical ; bright scarlet ; flesh firm, of good flavor ; a superior market berry, but unfortunately it does not appear to be well adapted to all kinds of soils and locations. Where it succeeds it will rank high for market purposes as well as for home use. An accidental seedling, introduced by a Mr. Fетters, of Lancaster, Ohio. Figure 35 gives a good idea of the size of this variety. From "American Agriculturist," 1878.

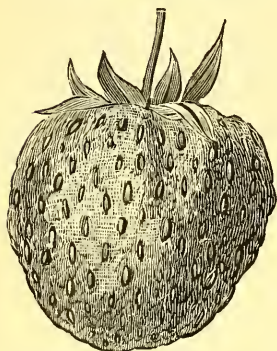


Fig. 35.—FOREST ROSE.

General McClellan.—See McAvoy's Superior.

Glendale.—Large, oblong-conic ; bright scarlet ; flesh firm, with a brisk sub-acid flavor ; a vigorous grower and a very productive, new variety, promising well for market. Introduced by Mr. W. B. Storer, who found it growing in the cemetery at Akron, Ohio.

Golden Defiance.—Large, obtuse-conical ; bright scarlet ; flesh moderately firm and of excellent flavor ; ripens quite late ; plants very vigorous, hardy, and productive. Promises to be a valuable acquisition to our list of good sorts. Pistillate. Originated with Mr. Amos Miller, of Pennsylvania. (Figure 36.)

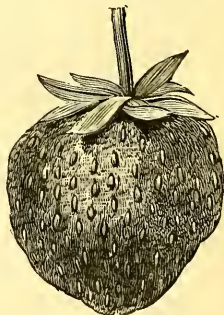


Fig. 36.—GOLDEN
DEFIANCE.

Golden Seeded.—Medium to large, bluntly-conical, sometimes flattened; dark crimson, with prominent yellow seeds; sweet and rich; early, but succeeds only in a few localities and soils. It is probably a seedling of a foreign variety. Originated in Canada with Mr. Read. Figure 37 shows the form and size of a medium sized specimen.

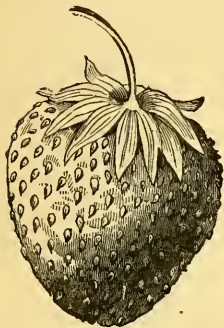


Fig. 37.—GOLDEN SEEDED.

Great American.—Extra large, irregularly oval; dark crimson; flesh moderately firm, second-rate in flavor, but under high culture and in the originator's grounds it has yielded some of the largest berries ever seen in this country. Although this variety caused considerable excitement among strawberry growers when first exhibited, it was soon discovered that it required extra culture to produce extra sized berries. It has fallen far short of what was expected of it when it was first introduced. Originated with Mr. F. W. Durand.

Green Prolific. (*Newark Prolific.*) — Very large, round; pale crimson or deep scarlet; seeds slightly sunken; rather soft, very acid, without richness, and of inferior flavor; fruit stalks long and stout; leaves very large and thick; one of the Iowa class; vigorous and productive. Originated with Seth Boyden, Newark, N. J. Figure 38 shows a berry of the average size under good culture.

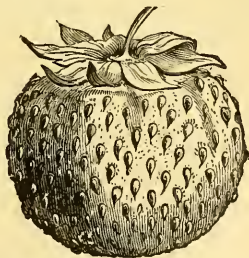


Fig. 38.—GREEN PROLIFIC.

Hervey Davis.—Large, obtuse-conical; bright scarlet; flesh moderately firm, nearly white, flavor good; season

medium ; plants tall, vigorous, and productive. Originated with J. B. Moore, Concord, Mass.

Hooker.—Large, short, obtuse-conical, nearly globular ; dark crimson ; very sweet and rich ; too soft and dark colored for market, but a fine variety for the amateur. The plants are a little tender, and should always be protected in winter to insure a good crop. Originated with H. E. Hooker, Rochester, N. Y.

Hovey. (*Germantown, Young's Seedling.*)—Large, conical ; bright crimson, handsome ; sub-acid, sprightly, good. An old and much esteemed variety, and largely cultivated for supplying the Boston market. Pistillate. Originated with C. M. Hovey, of Boston, Mass., in 1834.

Huddleston's Favorite.—This variety has been disseminated by E. Y. Teas, Dunreith, Ind., who describes it as a very large berry ; bright crimson ; firm flesh, with a rich, spicy flavor. Said to be a vigorous grower and wonderfully prolific. Pistillate.

Kentucky.—This is another of Mr. Downer's productions, and, like all those disseminated by him, of considerable value. Large, conical ; bright scarlet ; flesh white, moderately firm, excellent flavor ; ripens late, and continues in fruit a long time ; plants grow rather tall, but are vigorous, hardy, and prolific. A valuable variety, which has been fully tested over a wide extent of country. Succeeds well on light as well as heavy soils.

Ladies' Pine.—Small to medium, round ; pale orange-scarlet, with a slight crimson tint in the sun ; seeds rather prominent ; flesh soft, sweet and rich, highly perfumed, probably the most delicious flavored variety known. Requires extra culture, and even then it is not very productive ; nevertheless it is well worthy of a place in the most select collection. Pistillate. Originated in Canada, with Mr. Read.

Lady Finger.—Medium, elongated, conical ; color bril-

liant dark scarlet ; seeds set in a deep open cavity ; flesh very firm, sub-acid, good ; plant hardy, vigorous and prolific. An excellent market variety. Originated with the late Benjamin Prosser, Burlington, New Jersey.



Fig. 39.—LADY FINGER.

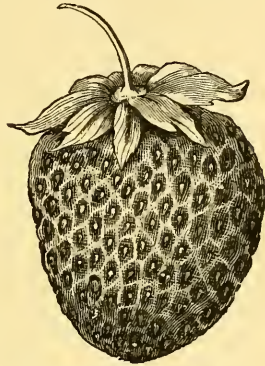


Fig. 40.—LADY FINGER.

Figure 39 shows a berry of this variety of medium size, and figure 40 one of the largest.

Lady of the Lake.—Medium, conical, with neck ; crimson ; flesh light colored, firm, not very juicy, but moderately good ; plant tall and vigorous, productive. Formerly quite a favorite in Boston market. Originated in Brighton, Mass.

Laurel Leaf.—A new variety, of which little is yet known. Described as of medium size, slightly conical, with short neck ; light scarlet ; in flavor good, but not superior ; plant only moderately vigorous and productive. Originated with Mr. A. N. Jones, Le Roy, N. Y.

Longfellow.—Very large, elongated-conical, somewhat irregular ; dark glossy red ; flesh firm, sweet and rich ; plant vigorous, with large, healthy foliage, and withstanding the hot sun admirably. Productive and continuing a long time in bearing. Originated with Mr. H. D. Webb, Bowling Green, Ky.

Lennig's White. (*Albion White, White Pine Apple.*)—Large, obtuse-conical ; seeds prominent, and of a pink or light crimson color ; fruit almost white, but with a delicate blush when exposed to the sun ; flesh pure white, melting, rich and sweet ; plant a vigorous grower, and moderately productive. This is evidently a seedling of *Fragaria grandiflora*, but one of the most hardy and productive, and, without doubt, the best white variety known in this country. It has been disseminated under several names, either through mistake or design. I received it under the three different names, and the lots being cultivated in separate beds, I, like many others, thought that they were distinct, until beds were prepared in a similar soil, and the same cultivation given to each, after which no difference could be discovered. I have since learned through Mr. Meehan, editor of the "Gardener's Monthly," that the supposed three varieties were all taken from the garden of the originator, Mr. Lennig, of Germantown, Pa.

Longworth's Prolific.—Large, roundish, oval or oblate ; light crimson ; sprightly sub-acid, and good ; plant vigorous and productive. An old variety but little cultivated, although it is far superior to many new ones. Originated in the garden of the late Nicholas Longworth, of Cincinnati, Ohio.

McAvoy's Superior.—Large, irregular, roundish, the surface being uneven, with prominent projections ; color varying from light to very dark crimson ; the flesh dark red, soft, sweet, variable, in some soils rich and sprightly, in others insipid ; vigorous, and usually very productive. Pistillate. The originator of this variety was awarded a \$100 prize by the Cincinnati Horticultural Society, about thirty years ago, but it has now become obsolete, and was long since discarded. I retain in the list on account of its history.

Marvin.—Large, elongated, somewhat beyond what is usually termed conical; bright crimson; flesh firm, but juicy, rich, and high-flavored; plant vigorous, stocky, and productive. A very promising new variety. Originated with Mr. Henry Marvin, Ovid, Mich.

Miner's Great Prolific.—Large to very large; somewhat irregular, but inclining to a globular form; deep crimson; flesh pinkish, firm, and of good flavor; plant vigorous, leaves large, light green, quite glossy. A productive and valuable variety, although the irregular form of the berries is somewhat against it for marketing. Originated with the late T. B. Miner, Linden, N. J.

Monarch of the West.—Extra large; globular, but often coxcombed; pale red; flesh soft, excellent flavor; plant vigorous on good soils, but only moderately productive. Valuable for its large size and good flavor. Originated with Mr. Jesse Brady, of Plano, Ill.

Nicanor.—Medium to small; conical; scarlet; flesh with a reddish tinge throughout, firm, juicy, and of excellent flavor; ripens early; the plants in my grounds have always been weak and unproductive. Still, I have seen them in rather heavy clay soils quite vigorous and carrying a heavy crop of fruit. Originated with Messrs. Ellwanger & Barry, Rochester, N. Y.

New Dominion.—A new variety unknown to me, but described by the disseminators of the plants as very large; globular; bright glossy red; flesh firm, and of good flavor. Originated with Mr. C. N. Biggar, on the battlefield of Lundy's Lane.

Neuman's Prolific.—Large under high cultivation, but ordinarily only medium or small; obtuse-conical; light scarlet, with a short neck; very firm, rather acid, but good when fully mature; plants strong, vigorous, and productive. A very popular variety in the South, where it is extensively cultivated for shipping to northern mark-

ets, where it may be seen among the first Strawberries of the season. Originated by a Mr. Neunan, of Charleston, S. C.

New Jersey Scarlet.—Medium; conical; light bright scarlet, with long neck; moderately firm, sprightly flavor, and good; very early and productive; the plant a strong and vigorous grower. Succeeds admirably on the light sandy soils of New Jersey. An excellent market variety. See figure 41 for size and form. Originated near Burlington, New Jersey.

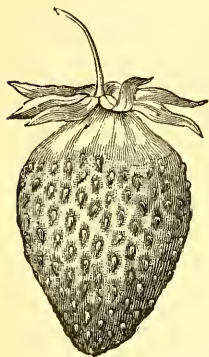


Fig. 41.—NEW JERSEY SCARLET.

Old John Brown.—Very large; broadly conic, pointed; light crimson; sweet, sprightly, and good. Originated with Dr. H. Schroeder, Bloomington, Illinois.

Orient.—Very large, and claimed to be the largest variety in cultivation; roundish-conical, sometimes a little irregular; bright scarlet, with glossy surface; flesh white, moderately firm, quality excellent; plant vigorous and productive, the fruit continuing of good size to the end of the season. A seedling of the Monarch of the West, raised by Mr. Oscar Felton, in 1876, and is one of several new varieties shown by him at the Centennial Exhibition.

Perry's Seedling.—Medium to large, globular, with a slight neck; color bright crimson; sweet, rich, and sprightly. Raised by Geo. Perry & Sons, Georgetown, Conn. See figure 42.

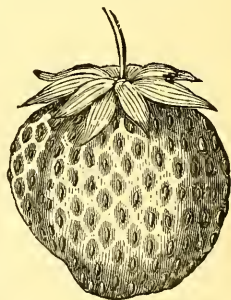


Fig. 42.—PERRY.

Pioneer.—Medium ; oval, with a long neck ; bright scarlet ; sweet, and highly perfumed. Very early, and appears to be gaining friends as it becomes better known. One of Mr. Durand's seedlings, which has not as yet been widely disseminated, although it has been for some time under cultivation.

President Wilder.—Medium ; obtusely-conical, very regular ; seeds yellow ; skin bright glossy scarlet ; flesh firm, but juicy, and very high flavored. A very handsome variety, but with me the foliage burns in summer, and for this reason, perhaps, the plants have never proved to be sufficiently prolific to warrant cultivation. In heavy or cool soils this would no doubt prove to be a valuable addition to even the most select list of Strawberries. Originated with the Hon. Marshall P. Wilder, Dorchester, Mass., in 1861.

Russell's Prolific.—Very large ; irregular, roundish-conical, with neck ; deep crimson ; moderately firm, sweet, and perfumed ; quality good, in sandy soils very good ; the flesh is lighter colored than the skin ; leaves large, with wavy upper surface ; lobes broadly ovate. Pistillate. Originated with H. Russell, of Seneca Falls, New York, in 1856.

Satin Gloss.—Medium to large ; rather long-conical ; calyx very large ; bright glossy vermilion ; flesh firm, of good flavor. The large calyx and

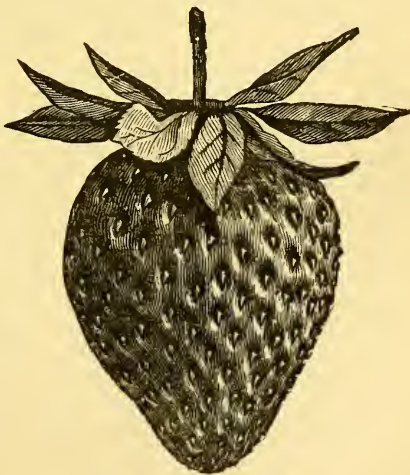


Fig. 43.—SATIN GLOSS.

firm flesh of this variety make it an excellent fruit for shipping, as it is not likely to become bruised during transit. Originated with Mr. Oscar Felton, from seed of the Lady Finger. Figure 43—from “American Agriculturist,” 1880.

Scotch Runner.—Small; oval; bright scarlet; good flavor. Largely cultivated for market in New Jersey, but should have been discarded long ago, and its place filled by larger and better varieties. Pistillate. Figure 44 shows one of the berries of full size.

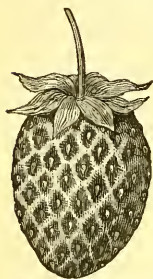


Fig. 44.—SCOTCH
RUNNER.

Scott's Seedling. (*Scarlet Runner.*)—Medium; elongated-conical; bright light scarlet, very handsome; sweet, rather dry, not high flavored, but good; plants moderately vigorous and productive. An old variety, but little cultivated at present; yet it is one of the most beautiful berries we possess. Requires good culture, and with it will yield an abundant crop. Originated about twenty years ago with J. Scott, of Brighton, Mass.

Seth Boyden. (*Boyden's No. 30.*)—Very large; irregular-conical, with long neck; dull crimson; flesh firm, rather dry, but sweet and of good flavor; plant extra strong and vigorous, and quite prolific when grown in hills, but otherwise unproductive. This is one of the best market varieties in cultivation, and under good care and in rich soils, berries of immense size are readily produced. Originated with the late Seth Boyden, of Newark, N. J., and disseminated by him as No. 30 of his seedlings, but since his death, by common consent, it has been given the name of the originator.

Sharpless.—This is another mammoth variety, and a genuine surprise to Strawberry growers generally, because it has proved to be all that was claimed for it at the time

of dissemination. Uniformly very large ; often broadly wedge-form, wider at the base than at calyx ; light glossy red ; flesh firm, but juicy, rich, and highly perfumed ; plants vigorous and productive. One of the best. I received some of the first plants sent out by the originator of this fine variety, and they succeed admirably, never failing to produce a good crop. Originated with J. K. Sharpless, near Philadelphia, Pa., in 1872.

White Pine Apple.—See Lennig's White.

Wilson's Albany. — Large ; irregular-conical ; dark crimson ; flesh firm, very acid, but good, and bears transportation well. One of the most productive varieties known. The plants will usually fail after producing one full crop, and the beds should be frequently renewed. This variety has probably done more towards advancing Strawberry culture in this country than any other variety that has appeared since the Hovey. Originated with John Wilson, Albany, New York.

MISCELLANEOUS VARIETIES.

Within the past few years new varieties of the Strawberry have been raised in such immense numbers that it would be impossible for any one man, or half dozen men, to test them all and learn their merits, or faults. But I may safely assert that not one in a hundred of these new kinds is an improvement upon the older and well known sorts. It is quite natural that the raiser of a new variety should look upon it with favor, and somewhat magnify its merits, for there are few Strawberries that do not possess some good qualities. It is an old saying that "some Strawberries are better than others, but all are good, and none actually bad." The success of a few originators of new varieties, and the ease with which seedlings can be produced, have prompted hundreds of amateur and professional cultivators to try their luck in

this direction ; as a result, there are hundreds of varieties named and offered for sale which are not worthy of any consideration. In addition to these worthless new sorts, old and well known varieties of merit will often appear in a garden, which the owner has no knowledge of ever having purchased or planted. Their presence may be readily accounted for upon the supposition that they have been introduced with other sorts, or a few plants have come, attached to the roots of some tree or shrub received from a nursery or neighbor's garden. The extra care and attention naturally bestowed upon these waifs when found growing in some out-of-the-way place, has a tendency to strengthen the finder's belief that they are really new, because the care given them usually produces good if not great results. The Romeyn Seedling is one of these waifs, which I pronounced *Triomphe de Gand* the first time the fruit and plants were shown in New York, and although I was roundly abused for my presumption, the Romeyn has at last found its proper place as a synonym of the old and well known *Triomphe de Gand*. The so called Maximillian, or Mexican Ever-bearing, is another variety which caused a good deal of excitement among Strawberry growers a few years ago, and although the story told of its discovery in Mexico and introduction into the United States, was enough to raise doubts in the minds of thinking men, still there were not wanting several, who had been generally acknowledged as authorities in such matters, to indorse and describe this variety as new and worthy of the highest praise and most extended cultivation. Two years after, this variety passed into the hands of practical cultivators, and it was generally admitted to be nothing else than the old Monthly Red Alpine of Europe, a variety which has been in cultivation nearly or quite one hundred years, and known by at least a score of different names.

Nearly all the varieties mentioned in my "Additional

List" in the first edition of this work have become obsolete, showing that they received all the attention they merited at that time. I now make up another similar list, containing, besides new and not fully tested varieties, some old ones still retained in cultivation for personal reasons, or because they possess some peculiar merit, or characteristics, not common to other and more widely cultivated sorts.

Austin or Shaker.—Old, but still retained in a few collections.

Cetywayo.—A pistillate variety from Ulster Co., N. Y. Promising for market.

Champion of Richmond.—From Cumberland Co., Pa. Has only a local reputation.

Chorlton's Prolific.—Productive, but too small, and poor in flavor.

Col. Ellsworth.—Of large size, but second-rate in quality.

Crimson Favorite.—Of extra fine flavor, but unproductive.

Cutter's Seedling.—Small, and of poor flavor.

Diadem.—Soft, acid, and unproductive.

Durand's Beauty.—New, promising.

Early Adela.—Early, but too small.

Eclipse. (*Prince.*)—Probably obsolete at the present time.

Emily. (*Huntsman's.*)—Raised some fifteen years ago, but I doubt if it was ever disseminated beyond the originator's gardens in Flushing, L. I.

Endicott.—New and untried.

Finch's Prolific.—From Ohio.

French's Seedling.—Old, but still retained in a few collections.

Fragaria lucida.—An old California variety, admired for its beautiful foliage.

Georgia Mammoth.—Small, but the plants are vigorous and prolific.

Golden Queen.—Has proved to be Trollope's Victoria, a foreign variety.

Hart's Minnesota.—Highly endorsed by Truman M. Smith, President of the Minnesota Horticultural Society. Fruit large, but second-rate in quality.

Ida. (*Cocklin.*)—Has been superseded by better sorts.

Iowa.—Once famous, but probably not now in cultivation.

Kerr's Prolific.—Has a local reputation, but is not in general cultivation.

Kramer's Seedling.—Originated at Dubuque, Iowa, in 1863, and a few years later sent out at eight dollars per hundred; but it is now almost if not quite extinct.

Kirkwood.—New, but its value is not yet determined.

Le Baron.—Once considered valuable, but has been superseded.

Mammoth Bush.—A pistillate variety, with only a local reputation.

Meade's Seedling.—A handsome, good-flavored berry, but too small.

Metcalf's Early.—Once a popular variety in Michigan, now very generally discarded.

Monitor.—One of the "Tribune" prize varieties; obsolete.

Mount Vernon.—Supposed to be identical with Kirkwood.

Panic.—New; promises to be a valuable variety.

Philadelphia.—Old, but is still retained in a few collections. Pistillate.

Piper's Seedling.—I have no information in regard to this variety further than that it is named in a few nurserymen's lists.

Reed's Kansas Mammoth.—New and little known.

Russell's Advance.—A good berry but a feeble plant.

Sucker State.—New and promising.

Walden.—New and untested.

Warren.—New; originated with Mr. H. L. Webb, Bowling Green, Ky.

Wilding.—New; originated with Mr. A. N. Jones, Troy, N. Y.

Wieland.—New and untested.

FOREIGN VARIETIES.

During the past dozen years there has been a very marked change in the opinion of our Strawberry cultivators regarding the value of foreign varieties. Novelties in European catalogues are no longer sought so eagerly as formerly; in fact, the importation of Strawberry plants is now confined almost wholly to amateurs, and I am inclined to think that but few of these gentlemen indulge in the once common practice of sending orders out to Europe for the latest novelties mentioned in the catalogues of English and Continental growers of this fruit. It is not because new varieties are not produced as abundantly as ever, but simply because our horticulturists have learned from experience that few European sorts will succeed in this country, and that, at best, they are inferior on the whole to our new improved native varieties. The old *Triomphe de Gand* and *Jucunda* still hold a place in the catalogues and grounds of both amateurs and professional cultivators, but beyond these, it is seldom that foreign varieties are exhibited at our fairs

or seen in market, with the exception of forced fruit. Of late the forcing of Strawberries under glass, in order to have the fruit ripen during winter, has become a business of considerable importance in the suburbs of nearly all our larger cities, and for this purpose some of the foreign sorts are said to be preferable to the native, owing in part to their mild flavor, when raised under these artificial conditions. For the above reasons, I have thought best to retain the foreign list very much as it was in the first edition of this work. Many new varieties might be added, but little is known of them, and their merits would have to be taken on trust, while those here named have been pretty thoroughly tested by myself and other cultivators in this country.

Ambrosia. (*Nicholson.*)—Large, roundish, dark red, sweet and very good, moderately vigorous and productive.

Admiral Dundas. (*Myatt.*)—Very large, irregular, often flattened, pale scarlet, very juicy, and brisk flavored.

Baron Beman de Linnick. (*Makoy.*)—Very large, oblate or flattened cone, light scarlet; seeds prominent; flesh pink, solid, sweet and perfumed.

Boule d'Or. (*Boisselot.*) — Very large, roundish, flattened, figure 45; color a bright, glossy, orange

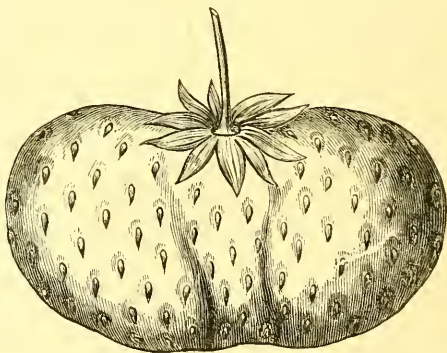


Fig. 45.—BOULE D'OR.

scarlet; seeds prominent; flesh white, sweet and good; plant robust and moderately productive.

Bonte de St. Julien. (*Carre.*)—Medium to large, con-

cal, dark crimson, sweet and good; plant quite vigorous and very productive.

Bijou. (*De Jonghe.*)—Fruit large, regular, bright, glossy red; flesh very solid, sweet and crisp; plant a very dwarf grower, and with me very unproductive.

Bicolor. (*De Jonghe.*)—Medium, conical, light crimson, sweet and good. A poor grower.

Belle de Vibert. (*Vibert.*)—Large, conical, light crimson, sweet, but not rich; flesh firm. A handsome berry; succeeds poorly, except in a very few localities.

Belle Artesienne. (*Demay.*)—Very large, conical, dark crimson, poor quality, and usually unproductive.

Carnelia Magna. (*De Jonghe.*)—Large, oval, bright, glossy vermillion; seeds projecting; flesh solid, pink, often hollow at the core, juicy and sweet; productive.

Deptford Pine. (*Myatt.*)—Large, pale orange scarlet, almost white in the shade, very sweet; the plant a vigorous grower, but unproductive.

Duke de Malakoff. (*Gloede.*)—Very large, irregular, dark, dull red, poor flavor, and unproductive.

Eliza. (*Myatts.*)—See rejected list.

Emma. (*De Jonghe.*)—Large, obtuse-conical, bright scarlet, sweet and good; plant hardy and moderately productive. A new variety that promises well.

Elton Improved.—Raised at the royal garden at Frogmore, England. Large, conical, bright, glossy crimson; seeds prominent; flesh solid, sweet, and good.

Empress Eugenie. (*Knevett.*)—Very large, irregular, flattened, dull crimson, poor flavor, unproductive.

Frogmore Late Pine. (*Ingram.*)—Very large, conical, sometimes flattened, brilliant crimson, firm flesh, and of good quality. A magnificent berry, but the plant burns badly in summer, and is unproductive.

Goliath. (*Kittley's*).—An old variety placed in the rejected list by the American Pomological Society in 1858, but still praised by a few growers. It is worthless.

Gwentver. (*Mrs. Clements*).—Medium, roundish or flattened, bright scarlet; flesh pink, juicy and sweet; vigorous, moderately productive and early.

Haquin. (*Haquin*).—Fruit large, flattened cone, bright red; seeds prominent; flesh solid, white, juicy and sweet; plant hardy, requires very high culture and a moist soil to insure even a moderate crop.

Hero. (*De Jonghe*).—Large, of a regular, globular shape, bright red; flesh carmine, very sweet; early.

Hillman.—Medium to large, oval, bright scarlet. New; from Germany; not fully tested.

Jucunda. (*Salter*).—Large, conical, bright light crimson or dark scarlet, excellent flavor; a good grower, but

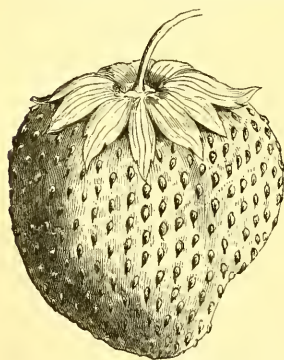


Fig. 46.—JUCUNDA.

rather tender; moderately productive. Figure 46. This variety has lately been revived under the name of Knox's 700, and it is said to be very prolific in Mr. Knox's grounds at Pittsburgh, Pa. I have cultivated it for six or seven years, but it has never proved to be any more productive than the mass of foreign kinds which I have tried. If it should prove valuable at the West, it will only be another instance among the many where the success of a variety is only local.

Kate. (*Mrs. Clements*).—Medium, conical, bright glossy red, solid, juicy, sweet, but sprightly; very early.

Kimberley Pine. (*Kimberley*.)—Large, irregular, oval or flattened, bright crimson; seeds very prominent; flesh very solid, red, juicy and brisk; productive, and late in ripening.

La Constante. (*De Jonghe*.)—Large, regular, conical, bright crimson, fine flavor; flesh firm; ripens late. One of the most beautiful Strawberries known. The plant is a dwarf grower, and requires a moist, rich soil, and even under the highest culture it is not very productive.

La Sultanne. (*De Jonghe*.)—Large, conical, bright deep scarlet, of excellent flavor, but the plant a poor grower, and unproductive.

Lucida Perfecta. (*Gloede*.)—Said to be a cross between the British Queen and the *Fragaria lucida* of California. Large, round, bright salmon color; flesh solid, sweet and rich. It is worthless with me, but it is said to do well in some localities.

Lorenz Booth. (*De Jonghe*.)—Large, oval, bright glossy red; flesh dark crimson, solid, sweet, but sprightly; hardy.

Leon de Saint Laumer. (*Dupuy Jamin*.)—Large, conical, bright pale scarlet; flesh carmine, rich, juicy and sweet; moderately prolific.

Lucas. (*De Jonghe*.)—Large, roundish, oval, glossy crimson; flesh hard, firm and crisp; good flavor, and a very good grower.

Marguerite. (*Le Breton*.)—Very large, long, conical, pale scarlet, sweet, but rather insipid. With extra cultivation it is quite productive, but the plant is naturally feeble. A very fine show fruit.

Napoleon III.—Fruit large, of a brilliant crimson; flesh firm, juicy; plant vigorous. The Austin has been sent out from several establishments in this country under this name.

Oscar. (*Bradley.*)—Large, slightly conical, dark crimson, sweet, rich and good. A very handsome variety, requiring extra culture.

Prince's Frederick William. (*Nivin.*)—Large, roundish, often flattened, light crimson, sweet, of fair quality, early, moderately productive; plant quite tender.

Souvenir de Kieff. (*De Jonghe.*)—Very large, flat cone; seeds very prominent; bright glossy crimson; flesh solid, pale red, juicy and good.

Sabreur. (*Mrs. Clements.*)—Medium, conical (see fig. 47); color bright orange scarlet; seeds very prominent; flesh solid, white, sweet, and of high flavor; productive.

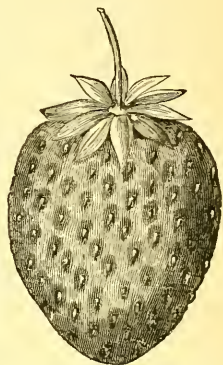


Fig. 47.—SABREUR.

Topsy. (*De Jonghe.*)—Medium, elongated, conical, (see figure 48,) bright light scarlet, sweet, sprightly and good; plant moderately vigorous and productive.

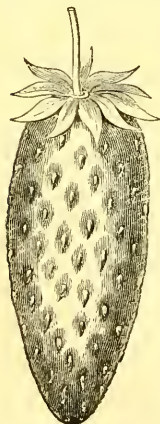


Fig. 48.—TOPSY.

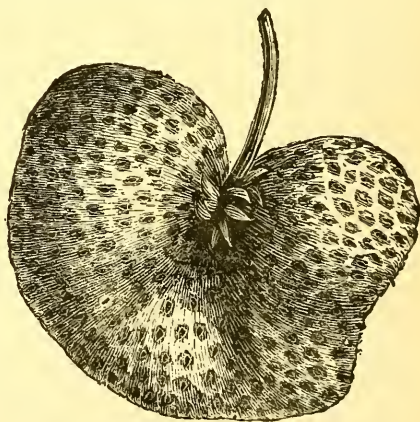


Fig. 49.—TRIOMPHE DE GAND.

Triomphe de Gand.—Very large, irregular, conical,

but often flattened, as in figure 49, bright crimson; flesh firm, crisp, not rich, rather mild flavor. This variety has probably been more extensively cultivated and given better satisfaction than any other foreign variety ever introduced. Among the hundreds I have tried, this has pleased me most, because with good culture it has never failed to give a large crop.

Vicomtesse Hericart de Theury. (*Jamin and Durand.*)—Large, irregular, conical, sometimes flattened, dark scarlet or light crimson; flesh firm, sweet, rich and excellent; early and productive. This variety, like the *Triomphe*, has been cultivated and widely disseminated, and may be placed as second to none of the foreign kinds.

Vineuse de Nantes. (*Boisselot.*)—Medium to large, flattened, figure 50, bright glossy crimson; seeds very prominent; flesh red, solid and sweet, with a peculiar vinous flavor.

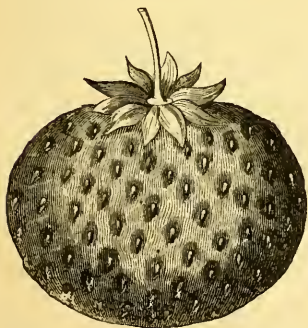


Fig. 50.—VINEUSE DE NANTES.

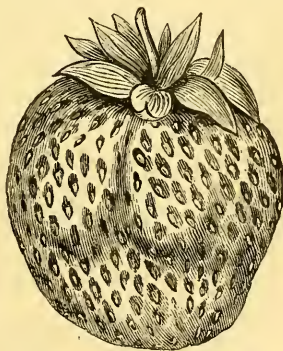


Fig. 51.—VICTORIA.

Victoria. (*Trollope's.*)—Figure 51. Very large, roundish-conical, light pale scarlet; seeds slightly imbedded, and set wide apart; flesh nearly white, juicy, but not rich, often insipid. The productiveness of this variety is extremely variable; in some soils it is very prolific, while in others, apparently as rich, it is unproductive. It is an

old English variety, discarded by nearly every cultivator in the country, yet it has been frequently brought out under a new name. Trembly's Union proved to be this variety, and was so declared by several fruit growers when it was first exhibited. The Golden Queen of Rochester, N. Y., is also said to be the Victoria.

I might add a hundred varieties more to this list, but it would be only increasing the number of names without adding any merit, and it is very likely that before these pages are read by fruit growers there will be another list of new kinds announced.

ALPINE STRAWBERRIES.

Alpine Red. (*American Alpine, Berancon, De Montreuil a Fruit Rouge, De Montreuil a Marteau, Fressant, Dent de Cheval, De Ville de Bois.*)—Medium, conical; seeds projecting; light crimson or dark scarlet, mild subacid, not rich, but good; plant very hardy, and moderately productive.

Alpine Red, Monthly. (*Autumnal Galande, Des Alpes a Fruit Rouge, Des Alpes de tous les Mois a Fruit Rouge, Des Alpes de deux Saisons a Fruit Rouge, Des Alpes de quatre Saisons, Alpine Rouge, Scarlet Alpine, Prolific Alpine, Poitou Alpine Monthly, Versailles Alpine Monthly, La Mendonaise, Glory de Nancy Alpinc, &c., &c.*)—Similar to the common Red Alpine, but produces a continuous crop throughout the entire summer. Requires high culture.

Alpine White. (*Alpine Blanc, De Montreuil a Fruit Blanc.*)—Same as the first, except in color of fruit, which is white, and the leaves are of a lighter green.

Alpine White, Monthly. (*Alpine Blanc, Des Alpes a Fruit Blanc, Des Alpes de quatre Saisons, &c.*)—Same as the common White Alpine, except that it bears a continuous crop through the summer.

Bush Alpine, Red. (*Wood Strawberry, Buisson a Fruit Rouge, Commun sans Filets, Sans Coulans Ordinaire, Sans Filets' Ordinaire, De Gaillon a Fruit Rouge, &c.*)—Medium, roundish-ovate, sub-acid, rather dry, agreeable; plant produces few or no runners; propagated by dividing the plants. Suitable for edgings of walks, or cultivating in pots or in very small gardens.

Bush Alpine, White. (*White Wood Strawberry, Buissons des Alpes Blanc, Buissons a Fruit Blanc, &c.*)—Same as the last, except in color of fruit. There are two other varieties, one with red and the other with white fruit, similar in every respect to the above, except they continue in bearing all the season.

Green Alpine. (*De Bargemont, Breslinge d'Angleterre, Caucasian, Green Pine Apple, Green Wood, Powdered Pine, Verte d'Angleterre, Frasier Vert, William's Green Pine, Gilbert's Large Brown, &c.*)—This variety is by some supposed to be a distinct species, but the appearance of the plant and fruit show it to be a true Alpine. Fruit small, roundish, depressed, greenish brown; flesh green, with a somewhat musky flavor. Cultivated more as a curiosity than for its fruit.

One Leaved Alpine. (*Fragaria monophylla.*)—Leaves simple, not divided; fruit same as the last. Raised in France in 1761 by Duchesne. Figured and described in Curtis' Botanical Magazine, vol. 2, 1788, plate 63. Probably not now in cultivation.

HAUTBOIS STRAWBERRIES.

Belle Bordelais.—Roundish-oval, dark brownish purple; flesh white, juicy, sweet, with a strong musky flavor. Said to produce a second crop in autumn, but has not with me, although I have given it good culture for the past six years.

Common Hautbois. (*Fragaria elatior, Dioecious Haut-*

bois, Musky Hautbois, &c.)—Medium, roundish or ovate, reddish green, strong musky flavor; fruit stems projecting above the leaves. Hence the name Hautboy or Highwood.

There are several varieties, the difference between them being very slight. The most common are:

Black Hautbois.—Medium, ovate, dark reddish brown.

Globe Hautbois.—Roundish ovate, reddish green.

Long Fruited Muscatelle.—Oblong, rather small, late.

Prolific Hautbois. (*Double Bearing, Hermaphrodite, Regent's Dwarf, Sacombe, Sir Joseph Banks, Caperon Royal, &c.*)—Conical; large for this class; flowers quite large. One of the best.

Monstrous Hautbois.—New. Said to be very large for one of its class. There is a variety being disseminated under this name, which does not belong to the Hautbois species.

The Hautbois varieties are very little cultivated in this country, as there are very few Americans who like their peculiar musky flavor.

CHAPTER III.

RASPBERRY.

NATURAL FAMILY ROSACEÆ.

[**RUBUS**.—The Latin name for the Raspberry and Blackberry derived from the celtic *rub*, red ; French name, *Framboisier* ; German, *Himbeeren Strauch* ; Dutch, *Framboos* ; Italian, *Rova-ideo* ; Spanish, *Frambueso* ; the old English name is *Raspis* or *Hindberry*.]

GENERAL CHARACTERS.

Perennial herbs, or somewhat shrubby plants, with biennial, and, in a few species, perennial woody stems ; flowers, white or red ; petals, five deciduous ; stamens, many ; seeds collected on a spongy, succulent receptacle, becoming small drupes. In the Raspberry, that which is called the fruit, is a collective mass of drupes, which readily parts from the dry receptacle when ripe.

SPECIES.

Our native species are divided into three classes by Dr. Gray, as follows :

CLASS 1.—Leaves simple ; flowers large, prickles none ; fruit and receptacle flat.

Rubus odoratus.—Purple Flowering Raspberry.—Stem shrubby, three to five feet high ; branches, stalks and calyx bristly, with glandular, clammy hairs ; leaves three to five lobed ; the lobes pointed and minutely toothed, the middle one prolonged ; peduncles many flowered, purple rose-colored ; fruit variable in size, from two or three

grains to nearly an inch in diameter, red, with a rather dry, musky flavor. Common, in most of the Northern States, in high rocky places. It is sometimes called Thimbleberry, Mulberry, etc.

Rubus Nutkanus.—White Flowering Raspberry.—Leaves almost equally five-lobed, scarcely bristly; petals oval, white, very much like the last, and probably only a variety of *R. odoratus*. Northern Michigan and westward, and northward to Alaska. The California Salmonberry (*R. velutinus*, Hook.) is now regarded as only a variety of this.

R. Chamæmorus.—Cloudberry.—Herbaceous, low; dioecious; stem simple; two to three-leaved; one-flowered; leaves roundish, kidney form, somewhat five-lobed; petals white; grains few, amber color. Native of Europe, particularly in the more northern portions, also in the high mountains of Maine and New Hampshire, and in the Canadas.

CLASS 2.—Leaves three-foliolate, sometimes simple, but rarely five-foliolate. Stems soft, woody, and somewhat prickly.

R. spectabilis.—Showy Raspberry.—Stems robust, five to ten feet high, bearing a few straight, stout prickles; leaflets ovate, acuminate double incised-serrate and often two or three-lobed; veins beneath as well as petioles, sparingly villous-pubescent; flowers mostly solitary, red, large, and showy; fruit large ovoid, red, or yellow. Common on the Pacific coast from California northward to Alaska. Var. *Menziesii*—Is more tomentose and silky, but otherwise resembles the species.

CLASS 3.—Leaves compound, of three to five leaflets. Stems annual, herbaceous, not prickly; fruit of a few separate grains.

R. pedatus.—Bird's-foot Raspberry.—Stems slender,

pubescent; leaves smooth or slightly villous; leaflets cuneate-obovate, about an inch long, incisely toothed. Flowers often solitary, on long slender peduncles, white, succeeded by fruit consisting of from three to six large red, pulpy drupelets. Pacific coast.

R. triflorus.—Dwarf Raspberry.—Stems erect, six to twelve inches high or trailing; leaflets three; rhombic-ovate or ovate-lanceolate, acute at both ends, coarsely doubly serrate, thin, smooth; peduncles one to three-flowered. Woody hill-sides throughout the Northern States. Not in cultivation, and no improved varieties known.

CLASS 4.—Leaves as in Class 3. Stems biennial and woody, prickly; receptacle oblong; fruit hemispherical.

R. leucodermis.—White-stemmed Raspberry.—Stem erect, but ends bending over, as usual with all the black-cap Raspberries; glaucous, armed with stout, mostly recurved prickles; leaves three-foliate, or sometimes pedately five-foliate, never simple; leaflets ovate to lanceolate, acuminate, double serrate, white-tomentose beneath, veins and petioles prickly; fruit large, but variable in color, from a yellowish brown to black, usually with considerable bloom. This species was first described by Douglas some fifty years ago, and recently in the Botany of California, but from long acquaintance with it, not only in its native habitats in the Rocky Mountains, and with plants from various sources cultivated in my garden, I cannot see why it should be separated as a distinct species from the *R. occidentalis*.

R. strigosus.—Wild Red Raspberry.—Stems upright, beset with stiff, straight bristles; leaflets three to five, oblong, ovate, pointed, cut serrate, whitish-downy underneath; fruit light red, finely flavored. Common everywhere, and many varieties of it in cultivation.

R. occidentalis—Black Raspberry.—Stems recurved, armed with hooked prickles; leaflets three, sometimes five, ovate, pointed, coarsely serrate, whitened underneath; fruit purple or black, occasionally yellowish-white. A variable species.

R. Idæus.—European Raspberry.—Stems erect, woody, prickles, slender, straight; leaves trifoliate; leaflets ovate, deeply serrate, whitish-tomentose beneath, green above; flowers white; fruit red or yellowish-white; root perennial, creeping, producing numerous suckers. Common garden Raspberry. Native of various portions of Europe, and probably of Asia. It derived the name *Idæus* from Mount Ida—this name being given it by the Greeks.

There are many other species of the Raspberry, natives of different portions of the world. In fact, there is scarcely a country with which we have any communication that does not possess one or more species. Many of these have been introduced, but so far none have proved of sufficient value to be worthy of cultivation.

The *R. Japonicus*, which was disseminated some years ago from the experimental garden at Washington, was supposed at the time to be of value, but it proved to be too tender for open air culture at the North, and we have no accounts of it from the South.

The *R. Idæus* has given thus far all varieties from abroad worthy of cultivation. But from our native species, *Rubus strigosus* and *R. occidentalis*, a number of very valuable varieties have been produced.

HISTORY.

Pliny, the elder, who is supposed to have written his natural history about the year 45, mentions the Raspberry as one of the wild brambles, which the Greeks called *Idæa*.

Palladius, a Roman agricultural writer, who flourished in the fourth century, or about fourteen hundred years ago, mentions the Raspberry as one of the cultivated fruits of his time.

Tusser, Gérarde and Parkinson mention the Red Raspberry, and Miller adds the White as among the varieties of his time.

But like most of the other small fruits, very little improvement was made until within the past century, as the old gardeners depended mainly upon the wild plants, which they obtained from the woods of their own or some foreign country.

PROPAGATION.

BY SEEDS.—Growing from seed is only to be recommended for the purpose of producing new varieties. Gather the fruit when fully ripe, and either dry it and preserve the seeds in this manner until wanted for planting, or wash the seed from the pulp and preserve in sand, or sow them immediately in the open ground. Raspberry seeds possess great vitality, and may be kept sound for years in any cool dry place. If sown in the fall they will germinate early in spring, and usually produce canes sufficiently strong to fruit the second year. If the seed is from a tender variety, then the young plants should be protected in winter, either by being taken up and heeled-in, or by bending down and covering with soil. It is usually better to take up the seedlings in the fall and heel them in until spring, then plant again, cutting them down close to the ground at the time. This will cause them to throw up strong canes, that will produce fruit the next (third) year in sufficient quantities to enable the grower to determine very nearly its relative value to other kinds.

BY ROOTS AND ROOT CUTTINGS.—A larger portion of the varieties of the Raspberry in cultivation produce

suckers from the roots, or what may be properly called underground stems.

There is, however, one species, and its varieties, which does not, as a rule, multiply in this manner, but as this is only a single exception, I will give the method of its propagation under the head of layers.

Some varieties produce suckers in great abundance, while others do so sparingly. This manner of propagation being a natural one, we take advantage of it, and not only allow the plants to produce suckers naturally, but dig up the roots and cut them into small pieces, and force each to produce a plant, thus increasing the number many fold.

To save repetition I will give a rule which will apply to all of the members of this great family of plants, whether it be the Rose, Raspberry, Blackberry, Apple, Pear, Plum, &c., &c., and that is, any of them which naturally produce suckers from the roots may be readily propagated from cuttings of the same. Those which produce them most abundantly are the most readily multiplied in this manner. Whether it would be advisable to employ this means of propagation upon every variety or species which is susceptible of it, is an open question, but upon the species now under consideration, there is scarcely a doubt of its utility; therefore I will give the manner in which I usually propagate those varieties of Raspberries which naturally produce suckers, as well as all of the varieties and species of the Blackberry. I follow the same plan for both, and with equally good results.

Take up the roots when the plants have ceased growing, and cut them into pieces of from one to three inches in length. Then prepare some boxes, by boring holes in the bottom to insure a good drainage, and place a layer of straw over the holes to prevent the soil from falling through; put on an inch or two of soil, over this a layer of roots, then a layer of soil, and so on until the box is full.

Bury the boxes containing the roots on a dry knoll or slight elevation in the garden, bank them up with soil, and cover so deeply that the roots will not be frozen. In

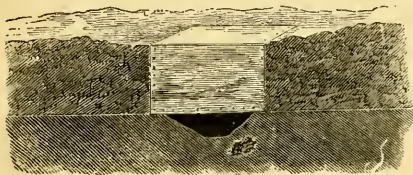


Fig. 52 — BOX OF CUTTINGS.

In addition to this, it is well to cover the whole with boards to carry off the water, and if the soil is naturally tenacious and wet, a small excavation should be made at a point that will be under the center of the box when put in place, as shown in figure 52.

This arrangement will allow any surplus moisture which may accumulate in the boxes to drain off. Early in spring, as soon as the weather and soil will permit, take out the roots and plant them in good rich soil, placing the pieces about three or four inches apart, in drills, and covering two to four inches deep, according to the nature of the soil. If it is a heavy one, two inches will be sufficient. When the plants are to be cultivated with the plow or cultivator, the drills should be three feet apart; but the best method is to place them not more than eighteen inches or two feet apart, and cultivate entirely with the hoe or fork. In a naturally dry and porous soil, it is a good plan to cover the entire surface, at the time of planting, with a liberal dressing of some coarse material as a mulch. This will insure a supply of moisture, and often save a large portion of the cuttings, if not the entire stock. Cuttings made in the fall, and placed where they will not freeze during winter, have an advantage over those made in the spring, from the fact that the peculiar process which always precedes the formation of roots, called the *callus*, has sufficient time for full development before actual root growth commences. The new roots are usually emitted from the ends of the cuttings where the callus appears. The callus is always produced first, roots

succeed it, but what relation the callus bears to the root is not fully known; it appears to hold the same relation to it that the cotyledons of some seeds do to the germ, *i. e.*, it supplies the roots with the necessary food until they are able to extract it from the soil themselves.

The buds from which the stems are produced are distinctly adventitious, that is, they do not arise from any previously formed or latent bud, but are developed from the matter between the bark and wood. From this point the bud originates; first, by a very minute aggregation of cells, which assumes a conical shape, pressing outward through the bark and up to the surface, where the leaves are spread out to the light and air. Sometimes several buds will be produced on a very small piece of root; but when this occurs all will be comparatively feeble if they continue to grow. In a majority of such cases the strongest of them will take the lead and the others fail.

Figure 53 shows a piece of root with two shoots, one of which has reached the surface, and the leaves expanding. Plants grown in this manner are much better than those produced in the natural manner from suckers, because they are more abundantly supplied with fibrous roots. Root cuttings of from one to three inches in length, planted in good soil, will make plants one to three feet high the first season. Plants may also be taken up, and the roots made into cuttings, in the spring, and planted in the same manner as described for those made in the fall.

When the variety is very scarce, then any small roots may be used for propagating, but in such cases it is best not to attempt it in the open ground, but place them in a propagating house. Cut the roots into pieces of from one-half to one inch long, mix with sand, and place in a warm situation, but not in so high a temperature as to force the formation of buds. When the callus is formed, and buds begin to show themselves upon the surface, which they should do in four to six weeks, place them in soil com-

posed of equal parts of leaf mold and sand, and in a position where they will receive a heat of seventy-five to ninety degrees.

When the plants have made a growth of four to six inches, they may be potted singly, or planted out into the open ground, provided the weather is warm and there is no danger of their becoming checked by cold.



Fig. 53.—ROOT CUTTING.

Root cuttings, however, produce the very best plants, and the number that can be made from the roots of one large stool, if given proper care, is much greater than one would suppose who has never tried it.

There will be occasionally a variety whose roots will develop buds very slowly with ordinary care, and they require a little forcing. With such kinds I have sometimes found it beneficial to place the boxes of roots in a

warm cellar or room, during winter, being careful not to keep them so wet as to cause them to rot, nor so dry that they will shrivel. In a warm situation, and with proper care in keeping them just moist and no more, both buds and roots are sure to be produced by planting time in spring.

LAYERS.—Layering, as a means of propagating the Raspberry or Blackberry, is seldom practiced, neither is it to be recommended, except in cases of extreme scarcity. To succeed with this mode, the layers must be put down

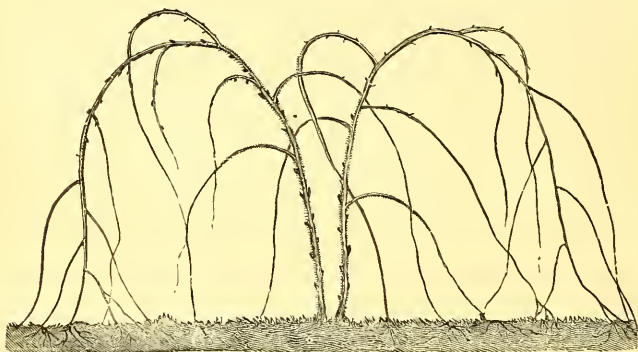


Fig. 54.—MANNER OF GROWTH OF BLACK CAP.

early in the season, so soon as the young canes are of sufficient size to be conveniently handled. A tongue should be made on the layer as with hard wooded plants, although with some varieties of the *R. occidentalis*, this is not necessary, as every portion of the branch that is covered will readily emit roots. Most of the varieties of this species grow in the form shown in figure 54. The canes grow very strong and stocky at the base, gradually becoming slender, and the ends bending down to the ground and taking root as shown, thus form a natural layer. The extreme point of the cane generally, after entering the ground, turns up, forming a large bud, from which the cane for the next season is produced.

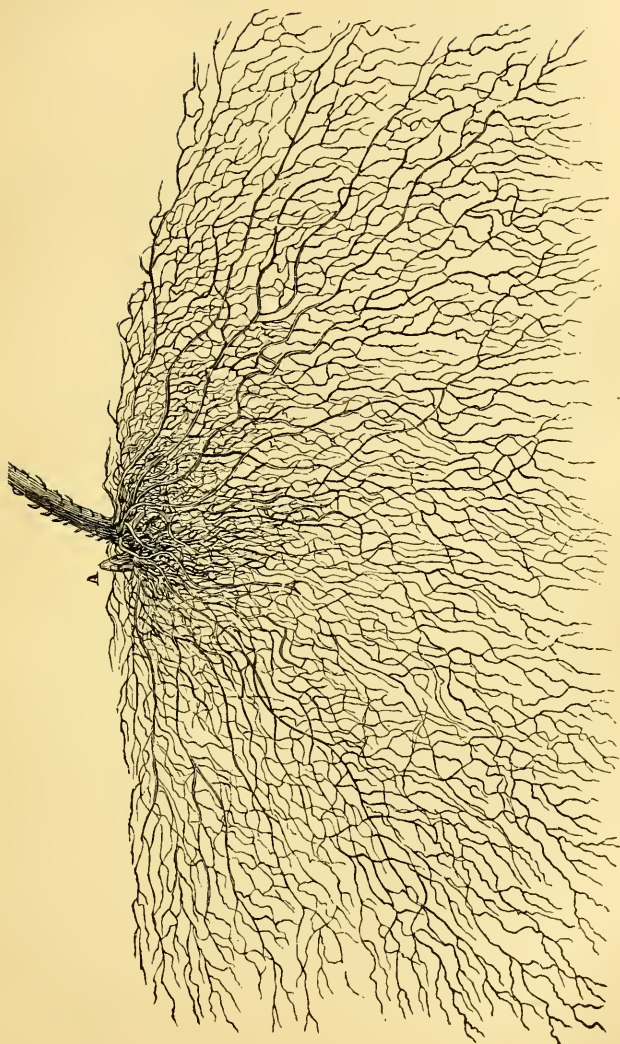


Fig. 55.—ROOTED PLANT FROM TIP OF STEM OF BLACK CAP.

In figure 55 is shown what may be called a well-rooted plant, produced from the tip of one of the canes. When these young plants are taken up, a foot or more of the cane may be left on them for convenience in handling, but when planted again this should be cut off close to the roots, and but the one bud (*A.*) allowed to grow.

Occasionally more than one plant will be produced upon a single cane, because after the extreme end of the main cane has taken root, one or more of the buds immediately above it will push into growth, and being but a few inches off the ground they soon reach it and become rooted, as shown in figure 56. Sometimes the roots will become so interlaced that they are separated with difficulty, although in the engraving they are shown with very few roots.

If a foot or more of the cane is covered with soil, late in the summer, when the wood has become somewhat firm, roots will be emitted from every portion of it, and when taken up it may be separated, and each bud become a plant. The plants obtained in this manner are not generally as good as those produced from the extreme tip of the canes. It will very often be necessary to go over the plantation and cover the tips of the canes to insure their producing roots. If the plants are grown where the wind is constantly moving the canes about, their tips will not root, because they do not remain long enough in one place to allow the roots to penetrate the soil. All that is necessary is to throw a small quantity of soil on to the extreme end of each cane. A garden trowel is a good implement for this purpose, putting on just soil enough to keep the end of the cane steady in one place, and no more.

The time of performing this operation will vary in different locations and soils. In the latitude of New York City, the last of August to the middle of September is the usual time of covering or layering the canes. But care should be observed in not covering too early, as well as deferring it until too late.

The canes will usually show indications of becoming rooted, such as a slight enlargement near the end, a ces-

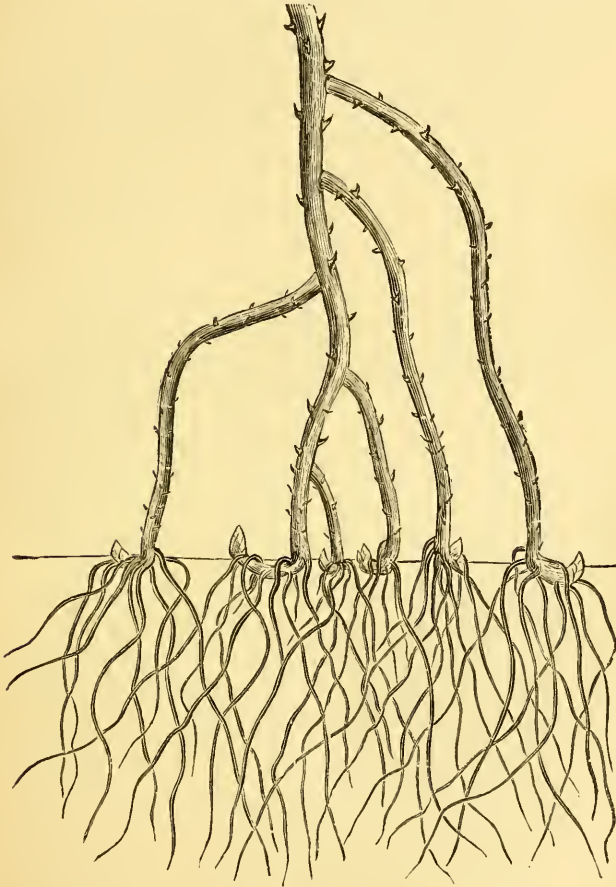


Fig. 56.—END OF STEM FORMING SEVERAL PLANTS.

sation of growth, &c., before it is really necessary or safe to cover them. If covered too early, and before the canes

have begun to ripen, they will rot, and no plant will be produced.

The roots will continue to grow until the ground freezes, and if the canes are in a proper state when covered, they will generally become well rooted in two or three weeks.

It is so little trouble to cover the tips, and thereby insure their taking root, that it is seldom advisable to neglect it, if the plants are wanted. All of the tips will not be in the same condition at one time, so that it will be necessary to go over the plants at least twice, covering a portion each time.

The same theory has been advanced by some cultivators in regard to the plants produced from the ends of the canes, as that which I have mentioned in a previous chapter, relative to the runners of the Strawberry. And there is just as much truth in one as the other; the only difference, in fact, lies in the strength of the plants, and should the last tip reach a lump of manure or richer soil than the first one, it would become a better rooted plant than the first, and superior to it in every respect.

There is another theory in regard to the production of plants of this class of Raspberry that has been accepted by many, and may be worthy of a passing remark.

The theory referred to was promulgated by Mr. Doolittle, the introducer of the Jocelyn or Doolittle Black Raspberry, and is this: "The first growth from the young plants only must be used for propagation." To carry out this plan, the young plants may be allowed to take root at the ends the first season, but thereafter, no plants must be taken from them, but new plants must be put out every season for the purpose of propagation.

Mr. Doolittle claims that great improvement can be, and has been, made by following this system for several years in succession, and if it is not followed, the plants degenerate. But facts do not substantiate the theory, because we have varieties that have been as many years in culti

vation as the one sent out by Mr. Doolittle, and although never subjected to this system, they have not deteriorated.

And further, there is not one grower of the Black Raspberry in a hundred who attempts to follow Mr. Doolittle's plan, but they propagate from the same stools from year to year, and yet this variety appears to be just as large, productive and good as it was when first disseminated.

Mr. Doolittle's theory is contrary to the one usually accepted in regard to fruit trees, for with them we generally select wood for propagation from fully developed specimens, believing that by doing so we are more likely to insure productive and healthy plants, than by pursuing an opposite course.

Young plants may sometimes produce better ones than old, because when planted on fresh soil, and the stem being entirely removed, they start early, making a comparatively small plant the first season—the ends of the branches reach the ground earlier, and become rooted before they would from older stools. Just so long as the old plants can be kept growing vigorously, and the young canes remain healthy, they may be used for propagation without danger of deterioration.

All of the varieties of the Black Raspberry are more or less subject to producing what are generally called *sports*, that is, the plants vary from the usual type very often without any apparent cause. Sometimes the plant will assume a very different character from the normal one, becoming barren, leaves smaller, canes of a different color, &c., while in other instances these sports will be a decided improvement upon the original, the fruit becoming larger and produced in greater quantity, or two crops will be borne in a season instead of one.

These changes may be the result of neglect in culture, diseases, or from extra care, which causes a more rapid and full development than usual.

BY CUTTINGS.—There are but few varieties of the Raspberry that can be successfully grown from ripe wood cuttings. Some of the Black Raspberry class will succeed if the cuttings are made early in the fall, and then placed in a propagating house, but, as a rule, there is nothing gained in endeavoring to propagate them in this manner. Green wood cuttings, however, grow very readily by the same process used by propagators in multiplying grapes and other plants.

The cuttings may be taken from plants growing in the open air, but it is better to take them up in the autumn and pot them, and place in a propagating house, and then take off the young growth from time to time as it appears.

All the varieties and species of the Raspberry and Blackberry may be successfully propagated in this manner whenever it is desirable; although there being so many other methods of multiplying them, that it will seldom be necessary to resort to this one.

Single bud cuttings may be made of the mature wood in the fall, always selecting the medium sized branches and those that have not become very hard.

In making these single bud cuttings, cut off the cane about half an inch above the bud, and the same distance



Fig. 57.—SINGLE BUD CUTTING.

below, and then divide the cutting through the middle lengthwise, preserving the half that contains the bud (fig. 57). Plant

them in boxes or pots, about an inch apart, covering about half an inch deep; then place them where they will be in a temperature of from 75 to 100 degrees. This is not quite so certain a method as the others, still with some varieties very good plants can be produced by an experienced propagator. When propagating the Blackberry from single bud cuttings, the dividing of the stem lengthwise may be omitted, but with the Raspberry it is better than leaving them entire.

BY SUCKERS.—While, as I have previously stated, there are some varieties which naturally produce suckers in abundance, there are also others that do so very sparingly; and still these kinds do not multiply in any other way if left entirely to themselves. It is also true that those kinds which produce few suckers are more difficult to propagate from cuttings of the roots; consequently we must find some method of forcing the roots to produce a greater number of suckers than they do naturally.

This may be accomplished in the following manner: Late in autumn, or very early in spring, dig up the old stools by cutting off with a spade all the roots within a foot of the base of the stem.

In figure 58 is shown a plant of the Philadelphia Raspberry, the semi-circular white line showing the point where the roots are severed. The Philadelphia, Catawissa, and similar kinds, which do not sucker freely, are often treated in this manner. If more plants are wanted than may be expected if the roots are left entire, then another incision may be made in the same way one foot outside of the first, but in making it, no soil should be thrown out, the spade being thrust down into the soil its entire length, to separate the roots, and then withdrawn. After the



Fig. 58.—CUTTING THE ROOTS. roots have been divided, the surface of the soil should be harrowed over and made level. If a liberal supply of manure is applied as a top dressing, it will assist the growth of the plants very much. The roots remaining in the ground will usually throw up suckers in abundance, and make excellent plants.

SOIL AND LOCATIONS.

For the purpose of giving a general rule (exceptions included), I will divide the Raspberries into two classes, without regard to species :

CLASS 1.—The common Red and White kinds, taking the Antwerps as the foreign branch, and the wild Red as the native type. These require a deep rich moist soil, and one that is rather compact, such as a heavy loam or clay. These succeed very poorly in a sandy soil, unless it be in the extreme North.

CLASS 2.—The Black Raspberry (*R. occidentalis*) and its varieties succeed in both light and heavy soils (although they prefer the former), and in the most Northern as well as in the Southern States.

To this peculiarity of the varieties of the two classes, we owe, in a great measure, the diversity of opinion so often expressed by fruit growers from the different sections of the country.

The Antwerp class, as a whole, do not succeed upon light soils south of latitude forty-one, and they sometimes fail even to the north of this. In the sandy soils of New Jersey, and farther South, their leaves burn in summer, which prevents the canes maturing; consequently they die in winter whether covered or otherwise.

This has been one of the great obstacles to Raspberry culture, as this class has been the one chiefly recommended, for the very good reason that the fruit was of superior quality, although the plants were delicate.

North of the latitude named, very few of the varieties cultivated are hardy, and protection in winter is required. A few of the native Red kinds will withstand the cold of winter at the North, but for some cause they have not as yet become very popular. These few kinds, which are hardy at the North, often fail at the South from the cause named, and the canes winter-kill even in a very mild

climate. The fact that one class succeeds better in a heavy soil than a light one should not be overlooked, even at the South, but taken advantage of whenever practicable.

SELECTION OF PLANTS.

The canes of all the varieties of Raspberries are only biennial, that is, canes are produced one year, bear fruit the next, and then die; therefore there is no such thing as two or three year old plants, as with trees and vines, when we refer to the stems, but the roots may be several years old, as they are perennial. One year old plants are the best for transplanting in all cases. Suckers are considered the best plants with those kinds which produce them, but plants grown from root cuttings, if the operation is properly performed, are equally as good, and sometimes they are really superior, because furnished with a larger number of fibrous roots. The same may be said of those grown from cuttings of the stems; they may be of first rate quality or otherwise.

The old stools may also be taken up and divided and planted again, but such plants are not to be recommended, and should never be used if it can be avoided. With those kinds which produce plants from the tips of the canes, it is more important to select none older than one season, because the old plants produce new fibers very slowly at the best, and when transplanted they are very likely to fail, even with the best of care.

PLANTING AND CULTURE.

Thorough preparation of the soil before planting is just as important with the Raspberry as with other fruits.

Planting in rows and then restricting the plants to hills or stools, as it is termed, is the usual method.

The rows should be four to six feet apart, according to the variety cultivated. With the Antwerp, and similar varieties, four feet each way is the usual distance, but with

the stronger growing kinds the rows should be at least six feet apart, and the plants four or five feet apart in the rows.

In planting the smaller growing kinds, two plants may be set in a hill, placing them about six inches apart; for in this way we double the chances of securing a uniform plantation, because one may die and the other live; and if both should grow, a large stool will be secured in less time than if the plants were placed singly. The first cost of the plant is not usually of so much importance as the loss of a crop, or of a year in time, which would be the result wherever the plants should die and have to be replaced. Spring is the usual time in the Northern States for planting the Raspberry, and the fall for sections where the ground does not freeze very deeply.

Select plants that have plenty of small fibrous roots, and set them no deeper than they were before removal. The upper tier of roots is usually about four inches below the surface, but in some instances they will be at a far greater depth. It is not advisable, however, to plant deeply, because the suckers which spring from the stem below ground, or from the lateral roots, will not come up so freely when the plants are set deep as when shallow. At the time of planting, cut the canes down close to the surface of the soil, because if they are left entire, it will require nearly, if not quite, all the strength of the root to force the buds on them into growth. These will produce a few weak shoots, and perhaps some fruit, and then the canes will die down to the root and no farther.

The entire forces of the plant are required the first season to produce canes, if anything like a crop of fruit is expected the next.

In some sections of the country the soil is naturally very poor, and it may also be very difficult to obtain sufficient manure to enrich the whole of it before planting. Under such circumstances, the plants may be manured in

the hill by mixing a shovel full or more with the soil at the point marked for the plants before setting them.

Afterwards manure may be applied to the surface of the soil, and worked in with plow or cultivator. If barn-yard manure, or a compost of it, and other materials cannot be obtained, then bone, poudrette, or some other kind may be applied.

A plow or cultivator may be used among the plants for keeping the weeds down in summer, but keep the soil as nearly level as possible; never bank up the plants and let them remain in this situation for any considerable time. A small plow may be used to break up the soil between the rows whenever it is necessary, but the cultivator should be passed over it soon after, to level it down again.

If the variety cultivated is one that increases by suckers, allow but one or two from each root to grow the first season, and not more than six to eight from one stool in any one year thereafter, unless the production of plants is more important than that of fruit.

The fruiting canes will not always remain in one place, as the suckers will come up more freely upon one side than upon another, and the uniform distances between the stools will soon be lost, and some will be six feet apart while others not more than two. A little care given at the time the suckers are making their appearance in early summer, by cutting out where they are likely to be crowded, and preserving all where they are thin, will enable the grower to preserve the required number of bearing canes in each row.

It will often be necessary to use the hoe among the plants, because the plow or cultivator cannot be used to advantage, except in passing lengthwise of the rows, except for the first year or two, and not then unless great care was observed in planting, so that the rows are placed in direct lines each way.

Clean cultivation is important, because if the plants be

come choked with grass and weeds, it will check their growth, and not only the fruiting canes will suffer for moisture, but those intended for the next season's crop.

With varieties which produce no suckers from lateral roots, but only from the crowns of the main root, greater uniformity can be preserved in their cultivation. The only precaution necessary is to see that too many canes do not grow ; three or four are sufficient, all others should be cut off when they first appear.

PRUNING.

Very little pruning is necessary with the Raspberry, and in general field culture none is given, except to go over the plantation after fruiting and cut out close to the ground all of the old canes. Some defer this operation until winter or the following spring, but it is better to do it soon after the fruit is gathered, so that the young canes shall not be crowded by the old ones. Because no other pruning is generally practiced, it is no sufficient reason why it is not necessary, or that it would not be beneficial. The bearing canes should be pruned in the spring by heading back the leading shoots, and shortening the lateral ones. This operation is particularly beneficial to the Black Raspberry, Purple Cane, and others of this class, inasmuch as they produce such long slender canes that they would be broken or bent to the ground by the weight of fruit unless severely pruned.

The principal canes, as well as the lateral ones, should be shortened to about one-third their original length. When pruned in this manner the fruit will be much larger, and the plant will yield as many quarts as though the canes were left their full length. Besides, the plants will very often set more fruit when left unpruned than they can mature, and all is lost.

There are a few varieties in cultivation which produce two crops in a season ; that is, the year old canes throw

out lateral fruiting branches the same as other kinds, and the new canes of the season bear fruit on their terminal point or branches in autumn. This second crop, or what is really the first crop of the cane, is usually not a very abundant one, although highly prized by some persons, because produced at other than the usual season for such fruit. If it is desirable to increase the late crop, then the entire plants should be cut down at the time of the annual pruning. This will cause the young canes to start early, and having the whole root for their support, they will come into bearing earlier in the fall, and bear more abundantly than if two crops were produced.

TRAINING.

In general field culture the usual mode is to train to stakes, but many cultivators are now dispensing with these artificial aids, and by close pruning they endeavor to make the canes sustain their fruit without assistance.

I think, however, that it is questionable at least whether there is really anything saved by not using stakes, because many of the canes will be blown down by the wind, others will be broken by the weight of fruit, while the lateral branches will fall upon the ground, and the fruit become splashed with soil, thus making it unfit for use. The cost of stakes is but a trifle in comparison to the value of the fruit lost when they are not used, especially when it commands so large a price as it does in most of our eastern markets.

Chestnut stakes five feet long and two to three inches in diameter, made from large trees, cost me less than two cents each, and my location is within twenty miles of New York City, and where timber of all kinds commands a large price. I cannot afford to grow Raspberries without staking, because every stake will save on an average ten cents worth of fruit, and in many instances three times that amount.

In the great Raspberry plantations of New York, stakes are used, and every fruiting cane is tied up, early in spring. The stakes used are four or five feet long, one being driven near each stool, and the canes tied loosely to it. After the crop has been gathered, the stakes are all taken up and put away under cover until wanted the next season. The old canes are all removed in the fall, and all suckers not wanted for fruiting are taken up, preparatory to giving winter protection to those that remain.

WINTER PROTECTION.

Until within a very few years, the varieties principally cultivated for market were those of foreign origin. Occasionally one would be introduced that was quite hardy

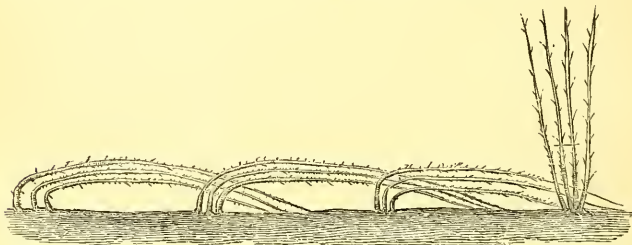


Fig. 59.—LAYING DOWN THE CANES.

even in the Northern States, but as a whole they required protection to insure a full crop. Many different methods for protecting the plants in winter have been suggested and tried, but there is probably none so simple or cheap as that of laying down the plants and covering with soil. To perform this operation rapidly, it requires two men, one to bend down the plants while the other throws a shovel full of soil upon them, or just enough to keep them in place. The canes should be bent down lengthwise of the row, as shown in figure 59. When the plants have all been laid down, a plow is passed along on each side of the row, turning the soil upon them. In this manner an acre

may be covered at a cost not exceeding fifteen dollars. The plants should not be covered until the approach of cold weather, usually deferring the operation as long as it can be with safety. If the canes are covered while the weather is warm, or before they are fully ripe, they will decay.

In the spring, after all danger of severe freezing is past, take up the canes by passing a fork under them, gently lifting and shaking off the soil. Drive down the stakes and tie the canes to them as before. Cut off all dead and broken canes, and shorten all others. When the canes are very tall, a foot or more may be pruned off with benefit to that which remains. All side or lateral branches should be shortened at least one-half, and sometimes if two-thirds of their length were cut away, it would be still better.

GARDEN CULTURE.

The same general systems adapted to field culture are also applicable to the garden, but usually more care will be bestowed upon a few plants than upon a larger number. When only a few are grown, they may be watered, or the ground covered with a mulch, either of which operations will assist very much in the full development of the fruit.

The plants may also be allowed to bear the first season, if fruit is very desirable, for by giving extra care, new canes for the next year may be produced from the same root, besides supporting the fruiting cane. It is, however, the safest plan to set three or four plants in a hill, and cut one or two of them down to the ground, and leave the others with canes about two feet long. Sometimes quite a large crop will be produced on plants set in spring, and though it usually prevents the root throwing up suckers strong enough to bear the ensuing year, still, with plants that cost but a few cents each, there is nothing lost even if they die outright after fruiting. With those who are just commencing a garden, it is sometimes quite an object to

have fruit the first season, even if there is no profit in the operation. A different system of training may also be adopted, and instead of stakes, a simple and cheap trellis may be made by setting strong stakes about twenty feet apart along the rows, and then stretch a wire from one to the other, and

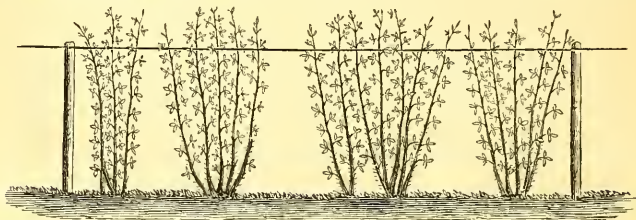


Fig. 60.—RASPBERRY TRELLIS.

to this tie the fruiting canes, as shown in figure 60. If the variety cultivated is tender, then bend down and cover the canes with soil in winter, using a spade or shovel instead of the plow.

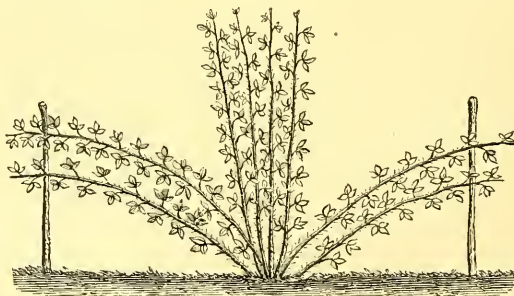


Fig. 61.—TRAINING TO STAKES.

Another method is shown in figure 61. In this the stakes are driven on opposite sides of the stools and about two feet distant, the bearing canes are bent over and tied in the manner shown. The young shoots of the season will not always grow up in the center as represented in the engraving, but that is the place where it would be desirable to have them grow to enable us to carry out this

somewhat ideal system. The bearing canes are cut away after the fruit is gathered, and the next spring the four young canes shown in an upright position, are bent down in the same manner as those of the previous year.

Training within a hoop is a very pretty plan for small gardens. This is done by driving two stakes, one on each side of the stool, and about a foot from it; then take a common barrel hoop and nail it to the stakes, as in figure 62. The canes are trained up within the hoop and tied to it at regular distances apart, thereby supporting the canes and preventing them from being blown about by the winds and injuring the fruit.

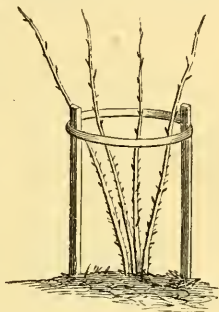


Fig. 62.—HOOP TRAINING.

There are many other very neat and convenient systems of training the Raspberry in use among amateur cultivators, but those already named will give the reader a very good idea of their general scope, besides suggesting other modes, such as training upon walls, fences, along the sides of walks or as a kind of a hedge, also planting and training in a half shady situation, with a northern exposure for a late crop, and in one of an opposite character for an early one.

So various are the changes that can be made in every department of fruit-culture, that to give them all in detail would require one or more large volumes for each species in cultivation.

DURATION OF PLANTS.

The duration of a Raspberry plantation will depend very much upon the variety cultivated, as well as upon the nature of the soil and care given the plants. Ten to fourteen years is about the average under good culture, but sometimes they will remain productive for twenty years.

No rule or set time should be heeded in this matter, but so soon as the plants fail to produce remunerative crops, plow them up and plant some other crop upon the soil, for two or three years, after which it may again be planted with Raspberries if it is desirable.

DISEASES AND INSECTS.

The diseases affecting the Raspberry are principally those known by the common names of rust and blight. They are microscopic fungi or parasitic plants of a low order, which seem to thrive best under conditions inimical to their victims. If plantations of the Raspberry are neglected, and weeds are permitted to grow and absorb the moisture and fertility of the soil, some of the many species of rusts are pretty certain to appear, and aid in the destruction of the plants. A cold, wet, or dry season, over-bearing of the plants, exhaustion of the fertility of the soil, in fact, any condition unfavorable to the growth of the Raspberry canes, is usually followed by the appearance of blight or rust. A peculiar species of red or orange-colored rust has, of late years, been very prevalent among both Raspberry and Blackberry plantations of the Eastern States, but appears to be more abundant and injurious to Black-cap Raspberries than other species. It has received the scientific name of *Uredo rubrorum*. Various remedies have been recommended, and while some may answer, together with good cultivation, the safest plan is to dig up and burn every infested plant as soon as it is discovered in one's grounds. Applications of lime, salt, ashes, soot, and similar fertilizers, may in some instances ward off attacks of fungoid diseases, but when they once become prevalent, the cultivator had better spend his time in setting out new plantations on fresh soil, than in attempting to renovate those that are old and diseased.

With insects the cultivator has a better chance of obtaining the mastery than with the microscopic fungi, although with some of the smaller and more numerous species of insects, he has enough to do if they are kept in check. Some kinds infest both the Raspberry and Blackberry, and as it would not be strange to find almost any of the species passing from the plants of one to the other, I shall treat of the enemies of both in this place.

The common cutworms are sometimes very destructive to the young suckers about the old plants, these pests severing them as they appear above the surface. In old and well-established plantations, the loss of a few hundreds or thousands of new shoots will not be missed, for others soon appear from the subterranean stems and roots; but in newly set plantations, the destruction of the first young shoots frequently causes the roots to die, and re-planting becomes necessary. I have found the cutworms a great pest, when setting out Black-cap tips, they appearing to be very fond of the young sprouts, and if left undisturbed will very soon destroy the plants. The only certain method of destruction of cutworms is to search about the hills or plants daily, and crush all that are found. They usually hide just under the surface, and not many inches from the plants they have attacked, or are about to prey upon. There are also several leaf-cutting pests which occasionally infest Raspberry plants, but with all these, dusting the plants with lime, ashes, and similar insecticides, will usually prove effectual. Among the insects affecting the canes, the common Raspberry-Borer, or Red-necked Buprestis (*Agilus ruficollis*), figure 63, is probably the most injurious, at least in the Western States. It is a small beetle of the form shown in the engraving, with a red thorax or neck. The larva bores the



Fig. 63.—RASPBERRY-BORER.

canes in summer, causing large excrescences or galls, checking the flow of sap, and causing the death of the cane.

The Snowy Tree-Cricket (*Ecanthus niveus*), figure 64, is another insect pest that appears to prefer the canes of the Raspberry as a nidus for its eggs, to the twigs of other shrubs and trees. It will, however, if there are no Rasp-



Fig. 64.—SNOWY TREE-CRICKET.

berry plants handy, deposit its eggs in the Grape, Willow, Peach, and other kinds of trees.

Its long, slender eggs are deposited in a close compact row, each egg placed at a slight angle, and deep enough to reach the pith of the cane or twig. This weakens the canes, and they are often broken off by the wind. This breaking of the stems is not a serious loss, but the perfect insect has the very bad habit of cutting off the leaves of various plants in summer; and sometimes extends its mischievous work from Raspberry plants to Grape Vines, from which it cuts both leaves and fruit; working at night when perfectly safe from observation. To get rid of the mature insect, I advise gathering the egg-infested canes and twigs in winter and early spring, and burning them. Of the insect enemies of the Blackberry, the Bramble Flea-Louse (*Psylla tripunctata*, Fitch; *P. rub.*, Riley) has been, perhaps, the most formidable of late years. The appearance of this insect in our Blackberry plantations, in sufficient number to do any considerable damage, is quite recent, probably within the past ten years. It is a small insect, and is quite closely allied to the Green Fly or Plant-Louse (*Aphis*), but is distinguished from that by a different veining of the wings, and by having knobbed antennæ, somewhat like those of the butterfly. These insects jump as briskly as a flea, from which characteristic they derive their scientific name. The presence of this pest in a Blackberry plantation is readily detected by the leaves of

the infested shoots in summer being twisted and curled up, and the ends of the young canes also curl over and frequently assume a singular fasciated form. In the fall the leaves on the infested canes do not drop off, but curl up, and remain attached to the diseased stems. This pest appears to be on the increase, especially in the Eastern States, and every one having Blackberry plants in his garden should be on the look-out for it, and, when found, it should be gathered and burned. This operation should be performed either early in the morning or during the cool wet weather, else many of the insects will escape, and at the same time the shoots, as severed, should be immediately dropped into bags, and then carried to the place where they are to be burned.

Several species of borers infest the Blackberry; one of the most common is a red-necked beetle, the *Oberea perspicillata* of Haldeman, figure 65. The small eyeless grubs bore the pith of the canes, causing them to die prematurely, or so weakening them that they are broken down by the wind. As there are some fourteen or fifteen species of the *Oberea* described in our entomological works, it may be that more than one infest the canes of the Blackberry and Raspberry.



Fig. 65.
BLACKBERRY
BUSH BORER.

The Blackberry is subject to the attacks of several species of gall-insects. A fuzzy, prickly gall on the twigs is produced by a four-winged fly (*Diastrophus cuscuteformis* O. S.). Another species of the same genus (*Diastrophus nebulosus* O. S.) produces a large pithy gall on the canes, but both of these gall-makers have very formidable parasitic enemies which keep them in check. There are also a few leaf-eating beetles, slugs, and caterpillars, that sometimes attack the Blackberry, but they are seldom sufficiently numerous or injurious to attract much attention. The larger species are readily destroyed by

hand-gathering, and the smaller ones can usually be driven off by dusting the plants with lime.

DESCRIPTION OF VARIETIES.

NATIVE SPECIES AND VARIETIES.

CLASS I.—THE BLACK CAPS (*Rubus occidentalis*).

American Black. (*Black Raspberries, Black Cap Raspberry, Thimble Berry*).—Fruit medium, slightly oval, black with bloom; sweet pleasant flavor; there is but little juice, a greater portion of the berry being seeds. The plant roots from the ends of the young canes. In its wild state one of the most variable species known. Common in all parts of the United States.

American White Cap. (*Yellow Cap, Golden Cap*).—Fruit one-half to five-eighths of an inch broad; slightly oval; grains larger than in the preceding variety; pale or deep yellow, covered with a white bloom; sweet, juicy, rather musky, but agreeable; canes light yellow, slightly glaucous, very strong, stocky, with a few short spines; only moderately productive. This variety is also found wild from Maine to the Mississippi River, and probably farther West. I have received it from nearly all the Northern States, and from the southern portion of the State of Delaware.

American Improved. (*Doolittle's Black Cap, Joslyn's Improved, Improved Black Cap Raspberry*).—Large, black, with slight bloom; sweet, juicy, of the same flavor as the Wild Black Raspberry; canes very vigorous, with numerous strong-hooked prickles. The extremely thorny character of the plant is its greatest fault, as it is equally as disagreeable a subject to work among as the Blackberry. Very productive and hardy. Found growing wild by Leander Joslyn, of Phelps, Ontario County, N. Y.

Caroline.—Very large ; globular ; pale buff or yellow, with slight bloom ; juicy, with a sub-acid flavor. Excellent for one of its class. This is claimed to be a hybrid between the Catawissa and Brinckle's Orange, but I think this is doubtful, as it is far more hardy and vigorous than either of the alleged parents, and the canes and leaves show it to be a genuine offspring of *Rubus occidentalis*. It is certainly one of the best, if not the very best, of the Yellow Cap varieties. The plants produce a few suckers from the roots, and this characteristic is cited as proof of its being a hybrid. Originated with Mr. E. W. Carpenter, of Rye, N. Y.

Davison's Thornless. (*Thornless Black Cap.*)—About the same size and shape as the American Improved, but a week or ten days earlier. Canes strong and quite stocky, smooth, except a very few small straight spines near the base and an occasional one on the leaf-stalk. The thornless character of the plant is certainly a decided improvement upon those which produce thorns in such abundance as do some others. Originated in the garden of Mrs. Mercy Davison, in the village of Gowanda, N. Y. ; introduced to the public in 1866, by Joseph Sinton, Angola, Erie County, N. Y.

Gregg.—Berry very large ; black, with bloom ; flavor about the same as that of all the best sorts, but not superior ; ripens late, and with the McCormick ; plant vigorous and productive. Found growing wild in a ravine on the Gregg farm, Ohio Co., Indiana, in 1866. This variety has been highly extolled, and while I am ready to admit that it is a valuable variety of Black-cap Raspberry, I fail to see that it is in any way superior to many other older and well known sorts.

McCormick. (*Large Miami. Mammoth Cluster.*)—Very large ; black, covered with a whitish bloom. One of the very largest and best sorts in cultivation, ripening

some two weeks later than the Doolittle, and a week or more later than the Seneca. Plants very strong, vigorous, and productive. An old variety, found in Ohio some thirty years ago, but re-named and brought out as new since the first edition of this work was issued. There seems to have been two varieties known as Miami. The large and small; the first, however, was known locally as McCormick, being named from the man who first cultivated and distributed the plants to his neighbors.

Miami Black Cap.—Large; dark brown, almost black; sweet, juicy, and good. A little later than the American Improved, and the spines not so numerous. Hardy, productive, and valuable. From the Miami Valley, Ohio.

Ohio Everbearing. (*Monthly Black Cap.*)—Large; black; sweet, and moderately juicy; canes strong, and rather more upright than some others; spines strong, hooked, and numerous; very productive. The young canes produce a moderate crop in autumn. Cultivated among the Quakers in Ohio, and introduced to public notice many years ago, by N. Longworth, of Cincinnati.

Seneca.—Large; black, with slight bloom, and good flavor; plants vigorous and productive. An excellent sort to fill up the season between the earliest and latest varieties. A good market variety.

Summit Yellow Cap.—Medium size; pale pink or nearly white in the shade; rather dry, but very sweet; ripens a little later than the Common Black Cap; canes strong and vigorous, pale-orange yellow, with considerable bloom; spines short, slightly hooked, and rather numerous. From Summit Township, Crawford County, Pa.

Surprise.—Very similar to the American Improved, but the berries are larger, more conical, and covered with a thick bloom; sweet, sprightly, and good; a valuable variety. Found growing wild in Missouri.

CLASS II. —PURPLE CANE FAMILY.

A portion at least of the following kinds are supposed to belong to the same species as the common Black Cap Raspberry (*R. occidentalis*.) But as they have a few characteristics in common, which are not found in the wild Black Raspberry, nor in any other species, I have placed them in a list by themselves.

This separation is not claimed to be a strictly scientific one, but as a matter of convenience.

The old Purple Cane Raspberry is so well known that I have selected it as the type or representative of this class.

The principal difference between the varieties of the Black Cap and the Purple Cane is in the fruit. The first, as is well known, have a rather dry, tough fruit, with a peculiar flavor. Its grains numerous, and very irregular in size. The fruit of Purple Cane, as a rule, is rather soft, juicy, often very brittle, the grains separating very readily. Color, varying from light red to dark brownish-purple, but never black; the flavor mild and agreeable, but entirely distinct from those of the true Black Raspberry.

Catawissa. — Medium, round, dark reddish-purple, rather brittle and soft, juicy, moderately good, canes strong, very branching, bark dark brown, and few hooked spines. Produces a second crop in autumn. If the whole stool is cut down in spring, the young canes of the season will come into fruit early, and continue bearing until winter. The fruit is borne principally on the ends of the shoots of those which do not bend down and take root. Suckers are also produced very sparingly, but if the stools are taken up, and the roots left in the ground, a greater number will grow than otherwise. The plant is quite tender in the Northern States, and even in the locality where it was discovered, it is sometimes winter-killed.



Fig. 66.—LEAF OF PHILADELPHIA RASPBERRY.

I have cultivated this variety about ten years, and have never as yet had a plant survive the winter unless protected. It is of no particular value unless for the purpose of producing a late crop, and to insure this the entire plant must be cut down early in spring. This variety was found in a graveyard, in the Village of Catawissa, Columbia County, Pa.

Ellisdale. — Large, roundish-oval, grains medium to large, quite regular in size; color, light crimson or dark scarlet; rather firm and of good flavor; canes very strong, light red, smooth, with a few straight spines near the base, and an occasional hooked one on the upper portion. The plant produces no suckers from its lateral roots, but propagates from the tips of the canes, the same as the Purple Cane. New, not thoroughly tested at the East, but considered as a very valuable variety in the locality where it originated. Found in 1856, by Mr. J. E. Johnson, growing on the Ellisdale farm, in Pottawatomie County, Iowa. The stock was placed in the hands of H. A. Terry, of Crescent City, Iowa, for propagation and dissemination.

Gardiner.—A very large, coarse growing sort, with large, dark, dull red, poor flavored fruit. I tested a few plants when it was first sent out, some fifteen years ago, and then dug them up. I am inclined to think that it received no better treatment from other growers, as it appears to have dropped out of sight and cultivation.

Ganarqua.—This is another variety of the Gardiner class, and having had a brief notoriety is passing out of cultivation. The fruit is rather large, well flavored, and attractive in appearance. This was claimed to be a hybrid when first disseminated.

Purple Cane. (*American Red Cane.*) — Medium, or small, roundish, dark dull red, with bloom; grains large, soft, sweet, very good; canes very strong; growing eight

to twelve feet long, smooth, with a few straight spines at the base, and a few hooked spines above; vigorous and productive, fruit good for home use, but too soft for market. This variety has been in cultivation in the vicinity of New York for at least fifty years. Propagates from the tips of the young canes, and produces no suckers.

Philadelphia. — Medium to large, globular, dark red, scarcely any bloom, moderately firm, sub-acid, not rich,



Fig. 67.—PHILADELPHIA.

nor very juicy; grains large, adhere more firmly than those of the Purple Cane; canes erect, strong, and stocky, dark red or purple, branching; spines very small, straight, and scattering, almost spineless; leaves large, dark green above, lighter beneath, very thick and tough, have a peculiar wavy appearance on the upper side, finely serrated.

Figure 66 shows the general form of the leaf, and figure 67, a cluster of fruit of the average size under common field culture. The canes do not bend over and root from the tips, like the Purple Cane, but produce suckers, although rather sparingly; very hardy and wonderfully productive. Found growing within the present limits of the City of Philadelphia, some thirty or more years ago. It has lately become very popular as a market variety, and for some soils and locations is unexcelled. This is particularly the case in the sandy soils of New Jersey, where all of the finest foreign varieties fail, and no amount of care will enable the growers to secure a remunerative crop. It has been widely disseminated in the past few years, and very favorable reports are being received from all parts of the country in regard to its hardiness and productiveness.

Reliance.—This is said to be a seedling of the Philadelphia, and resembles its parent, but, as usual, it is claimed to be far superior. I have not seen it, therefore cannot speak from experience as to its value, but those who saw this variety when exhibited a few years ago at Philadelphia, speak of it as strongly resembling its parent, the Philadelphia, with the same dull color.

CLASS 3.—VARIETIES OF RUBUS STRIGOSUS.

(*Wild Red Raspberry.*)

The common Wild Red Raspberry of our country possesses many valuable qualities, even in its normal state, as every boy in the rural districts knows. Without any thought of varieties, he is aware that a certain locality, the bushes along a certain road, for example, give him better fruit than he can find elsewhere. But to produce new and improved varieties from it has

seldom been attempted, because foreign kinds were at hand that apparently possessed qualities superior to our own; consequently we have very few native kinds worthy of cultivation. This is certainly to be regretted; inas-

much as the foreign varieties are usually tender, while our native kinds are quite hardy, and there can scarcely be a doubt that if the same persistent efforts had been put forth to improve them, as have been expended upon the foreign sorts, we would now have varieties of the native species far superior to any that we have obtained from abroad.

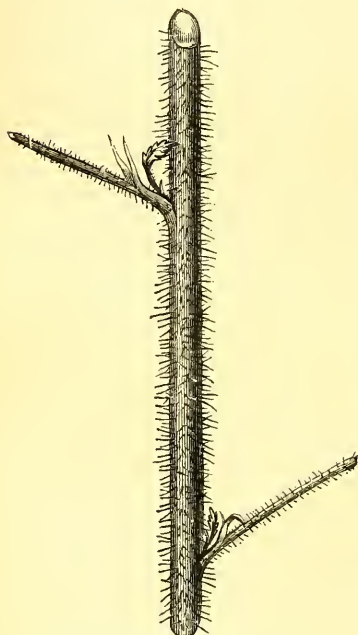


Fig. 68.—STEM OF WILD RED.

The variableness of the *Rubus strigosus* is worthy of being particularly noticed by those who may attempt its improvement. Some of the wild varieties produce an immense number of suckers, others but very few. Some have very smooth canes, others are covered with close set spines or bristly hairs, as shown in figure 68. The fruit is also variable in color, from a dark red to a light bright crimson; globular or conical in shape, and of medium size. Figure 69 shows a fruit of about the average size when grown in good soil.

Figure 63 shows a fruit branch when coming into bloom, and figure 64, a leaf, both somewhat reduced in size. The

leaves are bright green and whitish-downy underneath, but not so much so as in some of the foreign varieties.

Allen's Red Prolific.—Medium, globular, light crimson, separates freely from the core, juicy, but mild flavor; canes strong, erect, reddish purple when mature;



Fig. 69.—FRUIT OF WILD RED.

spines white, long, slender, very few and scattering; leaves thin, oblong, pointed, evenly serrated, not toothed. Not very prolific, and produces suckers rather freely, but not so abundant as the next.

Allen's Antwerp.—Similar in size, shape, color and

quality to the last, the leaves deeply serrated or toothed, and of more substance; spines very numerous, and of a



Fig. 70.—FLOWERING STEM OF WILD RED.

reddish-purple color. Both this and the preceding variety were sent out by L. F. Allen, Black Rock, N. Y., about

ten years ago, but they have been placed on the rejected



Fig. 71.—LEAF OF WILD RED.

list by the American Pomological Society, and almost uni-

versally discarded by fruit growers. They were not claimed to be seedlings by Mr. Allen, but merely accidental varieties of the wild Red Raspberry of his locality. I have been more particular in giving them a description, because it is very probable that they will again be brought forward by other parties as new and valuable varieties.

Brandywine. (*Susqueco. Wilmington.*)—Medium to large; round; bright scarlet; firm, and of agreeable flavor; canes stocky, but rather short, of a reddish color, bearing a few light-colored spines or prickles; plants productive, and very hardy. An excellent market variety, but because of its rather dwarfish growth it requires a strong, rich soil. Origin unknown, but supposed to have been found near Wilmington, Del.

Cuthbert. (*Queen of the Market.*)—Large; roundish-conical; bright red; firm, but juicy, with a sprightly, agreeable flavor; canes strong and stocky, well beset with small straight prickles; leaves firm, dark green, and resisting the hot sun as well as any of our native sorts. Very hardy and productive, and altogether one of the very best of our native red Raspberries. Originated in the grounds of the late Thomas Cuthbert, at Riverdale, N. J., and disseminated by Mr. I. J. Simonson, of Staten Island, to whom I am indebted for plants, kindly sent me several years ago. It has been suggested that the Cuthbert is a chance seedling of the Hudson River Antwerp; I can see no evidence of any such parentage, but believe it to be a true and pure *Rubus strigosus*.

Kirtland.—Medium; nearly round; light bright-crimson; separates freely from the receptacle; moderately firm, sweet, of the same flavor as the wild Red; canes very erect, nearly smooth, pale red at maturity; produces a large number of suckers, quite productive, and the earliest of the class. The canes are also quite hardy. One of the best of the native varieties. Originated with Prof. J. P. Kirtland, Cleveland, Ohio.

CLASS 4.—FOREIGN VARIETIES AND THEIR SEEDLINGS.

The greater part of the following kinds belong to the foreign species (*Rubus Idæus*), but many of them originated in this country from seed of the foreign varieties.

The fact of their being produced here does not make them any the less or more valuable than those imported, although it will be conceded by most of our fruit growers that some of the varieties raised in this country are equal, if not far superior, to any that have been obtained from abroad. As a class, the varieties of the *R. Idæus* are larger and better flavored than those of our native species, *R. strigosus*, but there are very few of them that are hardy in the Northern States, and their leaves burn more or less at the South.

Antwerp Red. (*True Red Antwerp, Old Red Antwerp, Knevetts Antwerp, Howland's Antwerp, Burley's Antwerp, English Antwerp.*)—Fruit large, nearly globular, dark red, with bloom; grains large; juicy, sprightly flavor; canes strong and tall; spines light red and numerous. An old variety seldom cultivated at the present time, as it has been superseded by the following:

Antwerp. (*Hudson River, New Red Antwerp.*)—Large, nearly conical, firm, of a pleasant, sweet, but sprightly flavor; canes short, stocky growth, with few spines; the bark on the mature canes is of a peculiar grayish color; very productive, but requires winter protection. This is the great market berry which is so extensively cultivated in the eastern portion of the State of New York. Origin unknown, but supposed to have been procured in England, and brought to this country fifty years ago by Mr. Briggs, of Poughkeepsie, N. Y.

Antwerp Yellow. (*White Antwerp, Double Bearing Yellow.*)—Large, conical, pale yellow, sweet, but not high flavored; canes strong and vigorous, light yellow; the

leaves are pale green; spines long, slender, white, on some canes very numerous, but scarcely any on others. Rather more hardy than the red, but not sufficiently so to omit protecting. Of European origin, and but little cultivated, as it is not so productive or good as some others of a similar color.

Barnet. (*Lord Exmouth, Large Red, Cornwall's Seedlings, Cornwall's Prolific, Barnet's Antwerp.*)—Large, obtuse-conical, bright purplish-red, sprightly, pleasant flavor; canes tall, very branching, yellowish green. An old English variety of little value.

Brentford Cane.—Small to medium, obtuse-conical, dark red, inferior flavor. An old English variety of little or no value. Placed among the inferior varieties in the nurserymen's catalogues of forty years ago.

Belle de Fontenay. (*Amazon.*)—Very large, irregular, long-conical, deep crimson, with a thin bloom, separates freely from the core, moderately firm, rather acid, but good; canes very strong and stocky, branching; leaves thick, dark green above and silvery-white beneath; spines reddish-purple, short and stiff; very hardy and productive. Produces a second crop in autumn; the best of the autumn-bearing varieties. It produces a great number of suckers, the larger portion of which should be removed as soon as they appear to insure a good crop of fruit. This has frequently been confounded with *Mervielle des quatre Saisons*, but it is distinct. Originated in France. Figure 72 represents a berry of this variety rather below the average size which it attains under ordinary culture. It is very probable that the engraver

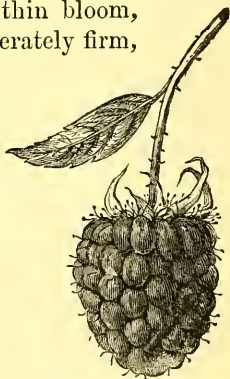


Fig. 72.—BELLE DE FONTENAY.

has rather reduced than enlarged the illustration of specimens placed in his hands.

Brinckle's Orange.—See Orange.

Burlington.—Large; same color as the Red Antwerp. Originated by the late Benjamin Prosser, of Burlington, New Jersey.

Belle de Palluau.—(Fig. 73.)—Very large; obtuse-conical; grains large, regular; light bright crimson, separates freely from the core, sub-acid, juicy, very good, moderately firm; canes very strong; spines short, purple, not very numerous; leaves medium, deep green; lobes broadly ovate; serratures very regular



Fig. 73.—BELLE DE PALLUAU.

and sharp pointed; very productive, and will probably become a valuable market variety. Requires protection in winter. From France.

Clarke.—(Fig. 74.)—Large; roundish-conical; light crimson; grains medium; very sweet, rich, and high flavored; parts freely from the core; moderately firm; canes very strong and stocky, erect, more or less branching; spines white, the ends slightly colored, rigid, numerous at the base of the canes, scattering, and few above; leaves very large, thick, rather flat, deep green above, and silvery white beneath, coarsely and unevenly serrate; very productive; moderately hardy. Raised from seed by E. E. Clarke, New Haven, Conn., in 1856.



Fig. 74.—CLARKE.

Cretan Red.—Small ; conical ; crimson or deep red ; sub-acid, poor flavor, not very productive. A very old foreign variety. Placed on the rejected list by the American Pomological Society.

Cope.—Large ; obtuse-conical ; light crimson ; parts freely from the core ; rather firm, sweet, and good ; canes moderately strong ; spines purple, short, and numerous ; productive, but not equal to some other varieties. Originated with the late Dr. Wm. D. Brinckle, of Philadelphia, Pa., to whom we are also indebted for many valuable varieties of the Raspberry.

Col. Wilder.—Large ; roundish-conical ; yellowish white or cream color ; very sweet, juicy, and good, but rather soft ; canes strong and vigorous ; spines white ; leaves dark green, somewhat crimped or wavy. Raised from the Fastolf by Dr. Brinckle, and named in honor of Marshall P. Wilder, the distinguished pomologist of Boston, Mass.

Cushing.—Large ; roundish-conical ; light crimson ; very regular in form ; grains small, compact ; separates freely from the core ; juicy, sprightly flavor, and good ; spines brownish-purple, stiff, and rather numerous ; leaves large and thin, irregularly and coarsely serrated or toothed ; moderately vigorous and productive. Raised by Dr. Brinckle, and named in honor of J. P. Cushing, of Watertown, Mass.

Cutbush's Prince of Wales.—Large ; very regular ; obtuse-conical ; light crimson ; rather dry, sub-acid flavor ; canes strong and vigorous ; spines purple, long, and slender, numerous ; productive. An English variety of no particular value, as many others are far better.

Double Bearing.—An old variety, which has been discarded by the American Pomological Society.

Downing.—Large ; regular, conical ; grains medium ; bright crimson ; juicy, sweet, and rich ; firm, parts freely from the core ; canes strong, erect ; spines very short and

stout, pale green ; leaves very large, deep green, nearly flat when fully developed ; quite productive. A good market variety. Requires protection in winter the same as the Antwerp. A seedling of the Orange, raised by Charles Downing, Newburgh, N. Y., who has no plants of any kind for sale.

Duhring.—Large ; roundish-conical ; bright red ; firm, rich, and excellent flavor. A strong and vigorous grower, and said to be very productive and hardy. New ; not fully tested. Supposed to be a seedling of the Hornet. Originated on the grounds of Henry Duhring, Esq., Belmont, near Philadelphia, Pa.

Emily.—Large ; roundish-conical ; pale yellow ; spines white ; vigorous and productive. One of Dr. Brinckle's seedlings, which proved unworthy of dissemination.

Fastolf.—Large ; obtuse, or roundish-conical ; crimson ; grains large, soft, sweet, and rich ; one of the best in flavor ; adheres so firmly to the core that the berries are often broken in picking ; canes moderately strong and rather crooked ; spines purple, stiff, and quite numerous ; very productive. An excellent variety for home use, but too soft for market. An old English variety ; its name said to be from an old castle in Great Yarmouth, England.

Fillbasket. (*Northumberland Fillbasket.*) — Large ; obtuse - conical ; crimson ; grains large, with thin bloom ; firm, sweet, not very juicy, but good ; canes strong, with purplish spines, which are quite abundant on the entire length of the cane ; leaves large, thick, not so deep green as some ; the leaflets broadly ovate ; quite productive. An English variety, introduced about ten years since.



Fig. 75.—FRANCONIA.

Franconia. (Fig. 75.)—*Naomi.*—Large ; obtuse-coni-

cal ; dark purplish-red, or crimson ; firm, with a rich, sprightly flavor ; canes strong, branching ; spines purple, stout, scattering ; leaves large, deep green, rather flat when fully developed. A valuable market variety. Requires protection in winter.

French. (*Vice President French.*)—Medium to large ; obtuse-conical ; crimson ; grains large ; firm, sweet, rich, and excellent ; one of the best ; canes very strong, erect ; spines purple, stout, and numerous ; very productive. A valuable variety. Supposed to be a seedling of the Fastolff. Raised by Dr. Brinckle, and named in honor of B. V. French, Vice President of the Mass. Horticultural Soc.

Fulton.—A large, crimson variety, raised by Dr. Brinckle. Probably lost, as nothing has been heard of it lately.

General Patterson.—Large ; round ; crimson ; adheres firmly to the core. One of Dr. Brinckle's seedlings.

Herstine's Seedlings.—The late D. W. Herstine, of Philadelphia, raised a large number of seedling Raspberries, and as some of them gave promise of excellence, he invited several prominent horticulturists of New York, New Jersey, and Pennsylvania, to visit his grounds and examine the plants while in bearing and full of fruit. The invited gentlemen responded to the request of Mr. Herstine, and visited his grounds on July 6th, 1870. Mr. Herstine had not performed any of the usual operations of crossing or hybridizing, in order to produce these varieties, but merely gathered seeds from what was said to be the Allen, growing near the Philadelphia, as well as some of the foreign varieties. He thought that his seedlings were a cross between the Allen and Philadelphia, but, as time has shown, this was doubtless an error, at least so far as relates to the parentage of the varieties selected and sent out as "Herstine's Seedlings." The four varieties selected and described at the date named, are here given, instead of distributing them in alphabeti-

cal order. I will add that there is an unnamed seedling of Mr. Herstine's in cultivation in several gardens in Bergen Co., which has the appearance of being a cross between the Allen and the Philadelphia. I received a few plants of it from Mr. Herstine, in 1872, labelled "Herstine's O.," and the plants have been distributed among my neighbors, some of whom prize it highly as a market variety. Canes are red, quite distinct. Fruit of good size, and of a bright crimson color.

Herstine.—Plant vigorous; an early and abundant bearer; canes strong, of a light color, covered with a whitish bloom; spines green, but not abundant; foliage abundant, of a light green color; fruit large; conical, with small grains, and of a crimson color; flavor sub-acid, but good. This is the best of the four sorts disseminated by Mr. Herstine.

Elizabeth.—A strong grower, and productive in favorable soils and localities; canes green, with some purple shadings; spines small, but very numerous; leaves light green, and quite large; fruit very large, nearly globular, and of a bright crimson color; grains large; flavor excellent.

Ruby.—A free grower; canes moderately vigorous; spines few, and small; leaves large, light green, whitish underneath; fruit of good size; nearly round; dark crimson; grains large; quality good.

Saunders.—Moderately vigorous and productive, producing a large number of suckers; canes green, with a shade of purple; spines abundant; leaves large, and of good substance; light green; fruit large; globular; of a crimson color; quality excellent.

Much was expected of the Herstine Raspberries, when first disseminated, but they seem to have failed in most localities. The first, or Herstine, is now considered the best of the four.

Hornet.—Very large; conical; deep crimson; grains variable in size, juicy, sub-acid, good; moderately firm; canes very strong, erect; spines short, purplish; fruit stems very long; productive, and promises to be a good market variety. Originated in France, with M. Souchet, of Bagnolet, near Paris.



Fig. 76.—HORNET.

Huntsman's Giant.—In size, shape, and quality, very similar to the Franconia, but the canes grow much taller, and when

fully mature have a peculiar grayish-white bark. A seedling of the Franconia, very productive, and continues a long time in fruit. Raised by Prof. T. W. Huntsman, Flushing, N. Y.

Imperial.—This is another French variety resembling the Hornet.

Jouet.—Medium to large; light pale yellow; canes feeble; spines very numerous; nearly white. Not worth cultivating, as we have several others of the same color which are far superior to it in every respect.

Knevet's Giant.—Large, or very large; globular; light crimson; adheres rather firmly to the core; juicy and good; canes very strong; spines short, purplish, very few, and scattering; very productive. An English variety of considerable merit.

Large Fruited Monthly. (*Rivers' New Monthly.*)—Medium to large; roundish-conical; crimson; soft, sweet, and juicy, good; canes strong; spines red, stout. Sometimes it produces a very fair crop, but not equal to Belle de Fontenay for a late one. Raised by Thomas Rivers, Sawbridgeworth, England.

Magnum Bonum.—Very similar, if not the same as the

Yellow Antwerp. Introduced from England many years ago.

Merveille de Quatre Saisons. (*Marvel of the Four Seasons.*)—Medium to large; obtuse-conical; crimson; soft, sweet, and good; canes erect, rather slender; spines purple, short, and quite numerous; leaves flat, pale green underneath, and not so dark green above as the Belle de Fontenay, which is often sold for this variety. The leaves are finely and evenly serrated. Very hardy, and produces an immense number of suckers. There is a variety with yellow fruit, but very unproductive.

Montclair.—Medium to large; globular; grains large; dark, and rather dull red when fully ripe; firm, and somewhat brittle; sub-acid, not rich, but would be called good; canes strong, vigorous, branching; leaves dark green, and of good substance; productive and hardy. Originated with E. & J. C. Williams, Montclair, N. J.

Orange. (*Brinckle's Orange.*)—Large; obtuse-conical; orange; sweet, rich, and delicious flavor; canes strong, with small, white spines; plant vigorous, and very productive. This is one of the best varieties in cultivation. Plant requires protection in winter. Originated by the late Dr. Brinckle, in 1845.

Pilate.—Large; long-conical; grains small, compact; dark red; firm, juicy; sub-acid, only passably good; canes not very vigorous; spines numerous, purplish red; productive. A French variety, highly extolled, but inferior to many of those produced in this country.

Rivers' Seedlings.—Mr. Thomas Rivers, the late veteran pomologist of England, paid considerable attention to the Raspberry, and has produced many hundreds of seedlings. Some of them have reached this country, but there appears to be considerable confusion in regard to their identity and names. The one known as Rivers' Black Raspberry does not belong to the Black Raspberry family of this country. It is a dark purple fruit, with a white bloom,

rather soft, of peculiar rich flavor, but not particularly valuable. Another, received under the name of Rivers' Seedling, is a large, roundish-conical berry, deep crimson, with a thin bloom, quite acid and not rich; canes very vigorous, branching, of a reddish color, spines purple, short, and very strong; produces very few suckers. Perfectly hardy and very productive; will probably be a good market variety. Mr. Rivers exhibited a new variety at one of the Horticultural shows in England a few years since, which he claimed to be a hybrid between the Raspberry and Blackberry, but I am not aware of its success.

Russell's Red Raspberry.—Large, roundish-conical, dark red, moderately firm, juicy, sweet and good; canes strong, erect; spines white, straight, few and scattering. Supposed to be hybrid between the Purple Cane and White Antwerp; very hardy and productive; propagated by suckers. Originated in the garden of Dr. G. W. Russell, Hartford, Conn., and named by the Hartford Co. Horticultural Soc., in 1858.

Souchettii. (*White Transparent.*)—(Fig. 77.)—Large, conical, somewhat irregular in form; pale yellow, firm but juicy, sweet and very good; canes vigorous; spines nearly white and few; leaves large and wavy, thin, light green. A pro-



Fig. 77.—SOUCHETTII.
ductive variety, raised by Mr. Souchet.

Semper Fidelis.—Large, irregular-conical, dull crimson, rather firm and dry, sub-acid; second rate in quality; canes strong, spines purple, short and stiff, numerous; leaves large, evenly serrated; very productive. A new variety from England, where it is highly extolled.

Walker.—Large, round, deep crimson, soft, juicy, sprightly flavor, good; canes strong with a few stiff, pur-

plish spines; very productive. One of Dr. Brinckle's seedlings.

Yellow Chili.—Large, conical, pale yellow, slightly tinged with orange, very soft, sweet and juicy; canes strong, branching, spines long, slender, white. A French variety which I received about ten years since. Not valuable, and inferior to several others of similar color.

Miscellaneous Varieties.—The following list comprises the new and old varieties of which little is known at the present time. Some of them have been merely announced in the nurserymen's catalogues, or in some of the various Horticultural Journals, while others are old foreign varieties that have been superseded by better kinds. I have added whatever information I possessed in regard to each. Plants of some of the new ones have been received, but not tested, consequently I cannot give a description, nor decide upon their merits:

Bromley Hill.—An old, red, English variety, of fair quality, but not productive.

Beehive.—Large red. (Prince's Catalogue, 1844.)

Cornish.—An old discarded English variety.

Chili Monthly.—An old foreign variety.

Cox's Honey.—An old white variety.

Early Prolific.—Poor flavor; an old variety from England.

Jillards's Seedling.—An English variety of very good quality.

Keystone.—Originated with A. L. Felton, Philadelphia, Pa. Described as very large, crimson. An excellent variety, although the canes are tender.

Longworth.—Large, round, deep crimson. One of Dr. Brinckle's seedlings.

Mrs. Ingersoll.—Large, yellow, of fair quality. Raised by Dr. Brinckle.

Mrs. Wilder.—A seedling of the Colonel Wilder, similar in color. Named by Dr. Brinckle.

Mote's Seedling.—New, from Ohio, of the *Rubus Occidentalis* species.

Nottingham Scarlet.—Rejected by the American Pomological Society.

New Everbearing.—Noticed in the Proceedings of the Cincinnati Horticultural Society, Dec., 1861.

Princess Alice.—A new, English variety, raised by Cutbush & Son, Highgate, England.

Richardson.—Noticed in Gardeners' Monthly, 1862, p. 339.

St. Louis.—Fruit large, bright red, sweet, and of the best Raspberry flavor; plant hardy.—*Coleman's Rural World*.

Surpasse Merveille.—Seedling of the Old Merveille des Quatre Saisons, yellow, same color and habit, but said to be superior to its parent; new. Raised by Simon Louis. Announced in the French Catalogues, in 1862.

Spring Grove.—Very prolific but poor flavor. An old foreign variety.

Superb.—A poor flavored, old, foreign variety.

Superb d'Angleterre.—Large, red. Andre Leroy's Catalogue, 1862.

Taylor's Paragon.—Poor flavor, old. Discarded European variety.

Wilmot's Early Red.—An old English variety, of small size, deep red, and poor quality.

Woodward's Red Globe.—Small, red, poor flavor; old. Cultivated in England about forty years ago.

Woodward.—Small, round, crimson; very early; spines red. One of Dr. Brinckle's seedlings.

SELECTION OF FOREIGN VARIETIES.—For family use, where they will succeed, I would select the following varieties: Brinckle's Orange, Clarke, Franconia, Fastolf, and French.

NATIVE VARIETIES.—For a few hardy native varieties, likely to succeed in light as well as heavy soils, and over a wide range of country, I would name among the bright red sorts : Cuthbert and Turner ; for a yellow, Caroline ; for purple or dark red, Reliance and Philadelphia ; and for black, Doolittle and Gregg.

FOR MARKET.—Hudson River Antwerp, Franconia, for particular locations ; and where these do not succeed, Cuthbert, Turner, Wilmington, and almost any of the score of Black-caps in cultivation. The Davison's Thornless, and Doolittle, are the earliest, and McCormick and Gregg the latest and largest.

CHAPTER IV.

BLACKBERRY.

RUBUS.—BRAMBLE.

The Blackberry belongs to the same family and genus as the Raspberry. The fruit in this case is a collective mass of drupes attached to the juicy receptacle—not separating as in the Raspberry, but falling off whole. In form, the berries are mostly ovate or oblong, brown or blackish, occasionally yellowish-white.

There are about one hundred and fifty species of the Blackberry known to botanists, and, like the Raspberry, they are distributed over a greater portion of the world.

Few of the species possess any particular merit worthy of the attention of fruit growers of the present time, consequently I shall confine myself mainly to the indigenous species and their varieties. The following six species are natives of the United States :

Rubus villosus.—Common High Blackberry.—Stems shrubby, two to eight feet high, furrowed, upright or reclining, armed with stout curved prickles; lower surface of the leaves hairy and glandular; leaflets three or pedately five, ovate, pointed, unequally serrate; plant varia-

able in size and in its general appearance. Figure 78 shows a section of the stem of the well known New Rochelle Blackberry, which is a variety of this species.

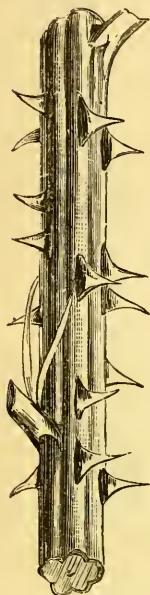


Fig. 78.

R. Canadensis.—Low Blackberry, Dewberry.—Shrubby, trailing slightly, prickly; leaflets three or pedately five to seven, oval or ovate-lanceolate, mostly pointed, thin, nearly smooth; flowers in racemes with leaf-like bracts; fruit mostly round, with large grains, sweet and pleasant flavor, ripens earlier than *R. Villosus*. Very common in dry sandy soils.

R. hispidus.—Running Swamp Blackberry.—Stems slender, shrubby, mostly trailing, with numerous, small, reflexed prickles; leaflets three, rarely five, smooth, obovate, coarsely serrate, entire toward the base; flower small, borne on a leafless peduncle; fruit purple or shining black, grains large and few; generally very acid. Common in the Northern States, in low, damp woods.

R. cuneifolius.—Sand Blackberry.—One to three feet high, shrubby, upright, armed with stout, recurved prickles; branchlets and lower surface of the leaf, whitish, woolly; leaflets three to five, wedge-obovate, thickish, serrate above; peduncles two to four flowered; petals large; fruit medium size, of good flavor, black, ripens late. Common in New Jersey and southward, in sandy soils.

R. trivialis.—Low Bush Blackberry.—Stems shrubby, trailing, bristly and prickly; leaves evergreen, coriaceous, nearly glabrous; leaflets three or pedately five, ovate-oblong, or lanceolate, sharply serrate, peduncles one to three flowered. Sandy soils, from Virginia southward.

R. spectabilis.—Flowers solitary, of a beautiful purple color; stems without prickles. Native of northwest coast of America, on the banks of the Columbia River.

R. fruticosus.—Stems straggling, arched, angular and rather tomentose; prickles recurved, fruit dark purple



Fig. 79.—EUROPEAN BLACKBERRY.

with a peculiar mawkish flavor. Common European Blackberry or Bramble.

There are several species of the Blackberry found in South America, West Indies, and Mexico, but we have no cultivated varieties of them, neither do they possess any qualities superior to those found in the United States.

Very little attention is paid to the cultivation of this

fruit except in this country, consequently we have no superior foreign varieties, nor can we find any practical information in regard to their cultivation, in any European work on gardening. The Blackberry has no separate history from that of the Raspberry, as they are both called *Brambles* in the old works; and it is evident that it has never been considered worthy of any special care in any country except our own.

Cultivation, Propagation, &c.—The same method of cultivation recommended for the Raspberry is also applicable to the Blackberry. In selecting a soil, a rather dry one is preferable to one that is very moist or wet; neither should the soil be as rich as for the Raspberry, because the varieties generally cultivated are large, coarse growing plants, and if the soil is too rich the canes will grow very large and succulent, and will neither be so hardy nor productive as those of a moderate growth. It is also a good plan to pinch off the terminal shoots the last of August or first of September, to check the growth, and cause the canes to more fully ripen than if allowed to grow undisturbed. The plants should also be given more room than the Raspberry, as they usually grow more branching and make larger stools. The rows should be at least six feet apart, and eight would be still better for the larger growing kinds. Staking the plants may be dispensed with if they are severely pruned so as to enable them to sustain the fruit. Many cultivators, however, always stake and tie up their plants, or build cheap trellises with posts and wire to which the canes are fastened in the spring at the time of pruning. It would be better to take out the old bearing canes soon after the fruit is gathered, but this would make it necessary to go over the plants twice, while if the old canes can be cut out and the young ones pruned at the same time, considerable labor is saved. One annual pruning is the usual method, choosing the early spring for performing this operation. For taking out the old canes a

pair of shears with long handles (Fig. 80) is used, cutting them as near to the ground as possible. A simple and equally efficient pruning implement is made by attaching a hooked knife to a handle of convenient length, as shown in fig. 81. The manner of using it is sufficiently obvious. The young canes should be headed back to four or five feet, and the lateral branches to a foot or eighteen inches. If too many suckers have grown, so that they are likely to crowd, then remove a portion of them, as directed for the Raspberry. All varieties of the Blackberry produce suckers very freely, and, unless they are wanted, all should be destroyed as soon as they appear, except those reserved for next season's crop.

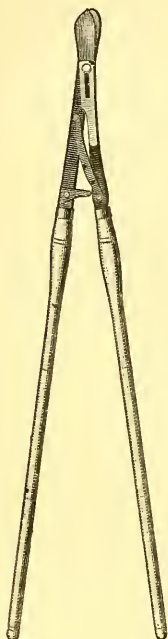


Fig. 80.



Fig. 81.

The Blackberry may be propagated as directed for the Raspberry, cuttings of the roots usually making the best plants.

VARIETIES.

Cut-Leaved.—Fruit roundish, black, grains large, sweet, with a slightly musky flavor; borne in loose panicles, stems nearly round, more or less trailing, fertile ones erect; prickles small at the base, but recurved and strong above, very numerous; leaves dissected and sharply serrate, as shown in figure 82; flowers white or rose color. A

variety of the European Blackberry, *R. fruticosus*, and is found in the Catalogues as *R. laciniatus*, and also as the Parsley-leaved Blackberry. It has been sparingly



Fig. 82.—CUT-LEAVED BLACKBERRY.

cultivated in Europe for many years, also in this country for twenty years or more. It is scarcely worth growing, except as a curiosity.

Cumberland.—Medium size, black, sweet and good, quite early, and matures the whole crop in a comparatively



Fig. 83.—LEAF OF DORCHESTER.

short time; plant quite hardy and productive. This variety is largely cultivated by J. Cox, of Bridgeton, N. J., and but little known elsewhere.

Cape May.—Very large, sweet, but quite soft, black when first ripe, but soon changes to a dull red. A very good variety for home use, but too tender for market.

Dorchester.—Fruit large, oblong, oval, slightly pointed, black, sweet, rich and excellent, with considerable of the wild Blackberry flavor; leaves broad, oval, with a sharp point, as shown in figure 83; ripens early, and the berries quite firm. An excellent market variety. The canes are very vigorous, and usually quite hardy. Not so productive as some, but sufficiently so to make it worthy of extensive cultivation. Introduced to public notice by the late Josiah Lovett, of Beverly, Mass., in 1850; he having procured the plants of a gentleman in Dorchester, Mass., about 1842.

Felton.—Very large, long, slightly conical, sweet and good; the berries often very defective; ripens early; rather of a spreading growth, and not so upright and compact as some. This was at one time supposed to be the same as the Wilson's Early, but it has lately been decided by several gentleman of Southern New Jersey, who are familiar with both varieties, that it is distinct, and not equal to the Wilson's Early in productiveness. Introduced a few years since by Oscar F. Felton, of Camden, New Jersey.

Holcomb.—Large, roundish-oval, black, sweet, rich and excellent; plant strong, vigorous and productive, similar to the Dorchester in size and productiveness, commencing to ripen about the same time, and continues in fruit for several weeks. Introduced to public notice by E. A. Holcomb, of Granby, Conn., in 1855.

Kittatinny.—Large to very large, slightly conical, deep shining black, moderately firm, sweet, rich and excellent; figure 84 is a fair representation of a well grown cluster; leaves ovate, with rather a long point, as shown in figure



Fig. 84.—KITTATINNY.

85, finely and unevenly serrate; plant a strong and vigorous grower, and very productive. The fruit begins to ripen



Fig. 85.—LEAF OF KITTATINNY.

a few days earlier than the New Rochelle, and continues for four or five weeks. This is an old variety, although

new to the public, as it was not extensively disseminated until last year, but, so far as known, it is very hardy, and promises to be one of the very best varieties known. Found, about twenty years ago, by a Mr. Wolverton, growing wild in the woods near the Kittatinny Mountains, in Warren County, New Jersey.

New Rochelle. (*Seacor's Mammoth, Lawton.*)—Very large, irregular, roundish-oval, black, very juicy, and moderately sweet when fully ripe, but it does not reach this point until several days after the fruit has become black, at which time it is very soft. A strong and vigorous grower, and very productive. The fruit commences ripen-



Fig. 86.

ing rather late, and continues for a long time, and unless the soil is naturally moist, or the ground covered with a mulch, many of the late berries will fail to come to maturity. The canes are also rather tender, often winter-killing, even in the vicinity where it originated. The New Rochelle Blackberry has probably done more to make this class of fruits popular than any other variety, but some of the kinds lately introduced are likely to supersede it. Found by Lewis A. Seacor in the town of New Rochelle, Westchester County, N. Y.

Newman's Thornless.—Medium, roundish-oval, black, rather acid, but good when fully ripe; canes slender, nearly round, growing only three or four feet high; spines small, short, as shown in figure 86; some of the canes almost smooth. It is usually very unproductive, but occasionally it will produce quite a large crop. Discovered growing wild, and introduced by Jonas Newman, Ulster County, New York.

Agawam.—A new variety, of which little is known. Larger than the Snyder, and Ancient Briton, but the plants are not so hardy.

Ancient Briton.—A very small wild berry from Wisconsin. Sweet, juicy, and of excellent quality, and the plants are very productive. Valuable only where larger and better sorts will not thrive.

Barnard.—A new variety, found in Iowa. Recommended on account of the hardness of the plants.

Dodge's Thornless.—From N. E. Dodge, Fredonia, N. Y. This was tried and found wanting some ten years ago. Plants feeble, and nearly destitute of both thorns and fruit.

Early Burnton.—Very small; sweet; scarcely worth cultivating.

Hoosac Thornless.—This is another wild sort, picked up in the woods of New England. Not worth describing or cultivating.

Knox.—New, and scarcely known among fruit growers, except a small number in Central New York.

Missouri Mammoth.—This is a wild variety, or, I might with truth say, several varieties, dug up from the fields and woods of Missouri, and disseminated by one who had good reasons for changing his name occasionally to avoid unpleasant exposures. It cost me one hundred dollars to get my first box of plants of these sorts, and to learn that I had been cheated. If there is any true or genuine Missouri Mammoth Blackberry in cultivation, it is unknown to me.

Sable Queen.—Fruit large; oblong; glossy black; grains quite large; firm, sweet, and excellent; canes very vigorous; hardy, and usually quite productive. Found growing wild about thirty years ago, in Essex Co., Mass.,

and introduced to the public notice by J. W. Manning, Reading, Mass.

Snyder.—A small variety, found growing wild near La Porte, Ind., thirty years ago, but it attracted no attention until quite recently, when it was discovered that the plants were exceedingly hardy. If the plants are given good cultivation, and close pruned, the fruit may be increased in size to a point where it would probably rank in the medium class, but with ordinary care, it is too small to command much attention. It ripens early, and is of good quality, and is valuable in localities where the larger sorts are tender. One of the most popular varieties in the West on account of its hardiness.

Taylor's Prolific.—A new Western variety, of medium size and good flavor. Recommended mainly on account of the hardiness of the canes, which are said to withstand a temperature of thirty degrees below zero without injury.

Wachusett Thornless.—This has been much praised on account of the scarcity of thorns on its canes. Fruit medium size and of fair quality, while the plants are vigorous and hardy, but not very prolific. Found growing wild in the Monadnock Mountains, in 1864, and introduced to public notice by R. R. Fletcher, Groton Junction, Mass.

Western Triumph.—A very large, irregular-shaped berry; very soft, juicy, and sweet; plants wonderfully vigorous, productive, and hardy. Owing to the softness of the berry, it has not attracted much attention from those who raise fruit for market, although it is a valuable one for the amateur cultivator. A chance seedling, found upon the open prairie in Lake Co., Ill., in 1858, by Mr. Biddle, of Waukegan.

Needham's White.—A variety sent out several years since, but it is unproductive, and not worth cultivating.

Wilson's Early.—Very large ; oblong, oval, slightly pointed ; black ; quite firm, sweet, rich, and good ; canes strong, roundish, not so deeply corrugated as the New Rochelle or Dorchester. It is probably a sport of the trailing Blackberry, or a cross between it and the high-bush. Although the plant is naturally an erect grower, still, occasionally, a cane will grow for several feet along the ground, and the tip take root, as is usual with the common creeping Blackberry, or Dewberry, as it is generally called. The fruit ripens very early, and the entire crop matures in about two weeks. This peculiarity in ripening gives the grower of it an opportunity of sending the entire crop to market before other varieties are ripe. Discovered by John Wilson, of Burlington, N. J., about 1854.

The following kinds I have not fruited, neither have I any very reliable information in regard to their merits :

Albion.—Found growing wild at Albion, Edwards Co., Illinois. The fruit is large, of a pink color.

Claret.—A new variety, found by D. L. Adair, of Hawesville, Ky. Fruit large, of a glossy claret color.

Col. Wilder.—Fruit bright cream color. Raised by John B. Orange, of Albion, Illinois, and named in honor of the veteran pomologist, M. P. Wilder, of Boston, Mass.

Crystal White.—A variety from the West. Fruit yellowish-white, and of excellent quality. The foliage of this variety is very peculiar, inasmuch as the leaflets are very narrow, almost oblong-lanceolate ; plants rather tender.

Dr. Warder.—Color a dark rosy-red. Raised from seed by Mr. Orange, the originator of the Col. Wilder, and named in honor of Dr. Warder, of Ohio.

PROFITS OF CULTURE.

The profits derived from the cultivation of the Raspberry and Blackberry are extremely variable. The first

thing to be ascertained by those who intend planting these fruits extensively is, whether there is a good market, and one that is not likely to be overstocked. Then find out what kinds are the best suited to the location.

For instance, if one is located in a section where the Red Antwerp and similar foreign varieties succeed, then it would be safe and perhaps preferable to plant them instead of others, because their fruit always commands the highest price in the market.

In many places at the West, as well as at the East, these varieties succeed, if protected in winter, and two to six hundred dollars per acre is no uncommon amount to be derived for the fruit; still there are many locations where no amount of care will make them yield enough to pay for their culture, consequently other varieties must be selected, or Raspberry culture be abandoned.

The Blackberry, as a general thing, does not bring quite so large a price in market as the Raspberry, but the yield per acre is often greater, so that the returns will be about equal, although, as a rule, they are not generally considered as profitable a fruit as the Raspberry. Whenever Peaches are plentiful, then late varieties of the Blackberry sell at a very low price. The cost of cultivation, gathering, and marketing these berries, is usually from one-fourth to one-third of the gross receipts obtained for the fruit.

CHAPTER V.

DWARF CHERRY.

NATURAL FAMILY ROSACEÆ.

PRUNUS. SUB-GENUS, CERASUS.—THE CHERRY.

The Cherries, as a class, do not come within the proposed scope of this work. But there is at least one native species that is worthy of being placed among the *small fruits*, and I have introduced it here for the purpose of calling the attention of our horticulturists to it, hoping that through their efforts a new, distinct, and valuable class of Cherries will be originated.

All of the varieties of the Cherry commonly cultivated, are of foreign origin, and the native species have so far resisted all attempts at improvement; as a general thing, there appears to be no affinity between those of the eastern and western continent. They will neither hybridize, nor the wood unite when worked one upon the other. Thus the door seems to be closed against the intermingling of the superior and the inferior, and progress only possible by raising seedlings of the native kinds without foreign aid.

There are, however, two indigenous species which appear to be nearly related to the foreign, at least sufficiently so, to

admit of being hybridized with it, as the flowers are very similar and the wood of the two unites very readily. One of these, *Prunus Pennsylvanica*, is a tall species, and does not come within the scope of this work; but a dwarf one, *P. pumila*, described by Dr. Gray as follows:

"Smooth, depressed and trailing, six to eighteen inches high; leaves obovate-lanceolate, tapering to the base, somewhat toothed near the apex, pale underneath; flowers two to four together; fruit ovoid, dark red. Rocks or sandy banks; Massachusetts northward to Wisconsin, and south to Virginia along the mountains."

The above is merely a general description of the species, but it varies considerably in different locations and soils.

It is thirty-five years since I first became acquainted with this species while examining the wild fruits of Northern Michigan, and by referring to my diary of 1846, I find the following notes:

"August 3d, 1846. Thunder Bay Islands, Lake Huron. --Visited Hat Island, and found Dwarf Cherry, (*Cerasus pumila*,) very abundant. The plants growing on the beach in almost pure sand; bearing stems depressed with the weight of fruit; wonderfully productive.

Fruit one-half inch long, and three-eighths broad; dark purple, nearly black, sweet, but rather insipid. Suckers abundant from the underground stems or roots."

At the time referred to above, I supposed this species was confined to the shores of the lakes, but have since learned that it is widely distributed over the Northern States. A few years ago, through the kindness of Prof. George Thurber, I received some Cherry seeds from Utah Territory, and from them raised plants which appear to be of the same species as the one described by Dr. Gray, as *P. pumila*, and also found by myself at Hat Island. There is, however, considerable difference in the growth of the plants; the one grown from the seeds obtained from Utah being more erect, none of the branches trailing

as in the species. This peculiarity of growth may not be different from the wild plants found in some localities.

I have some specimens now four years from seed. They are about three feet high; stem stocky, but the branches quite slender, cylindrical and smooth. The bark brown and shining on the small twigs, grayish when old. Fruit ovoid about a half-inch long, dark purple, nearly black, sweet, with little flavor. I do not consider this Cherry of any particular value as it is found in its normal condition; but if we could obtain an improved variety of a similar growth, and as hardy and productive, it would certainly be a great acquisition. There is no reason why this should not be accomplished, for, as I have said, it is nearly related to our cultivated varieties, and a hybrid can, and probably will be, produced between them.

The *Prunus pumila* should be selected for the parent to supply the seed, and the pollen, for fertilizing its flowers, taken from the other species. It blooms rather later than the Bigarreau, or Morello varieties, but can easily be hastened by planting in a warm situation or under glass.

To produce a hybrid between this Dwarf Cherry and the larger-growing kinds, requires no greater mechanical skill than to cross two varieties of the Strawberry; an operation which I have already described. The stamens and pistils in the flowers of the Cherry are large and conspicuous, and cross fertilization a very simple operation.

Here is an opportunity for the enterprising and skillful horticulturist to revolutionize Cherry culture, and he who first produces a fruit equal to the Great Bigarreau, or Early Richmond Cherry, and borne upon a shrub no larger than a Currant bush, will not only have his name handed down to posterity, but will be very likely to gather golden harvests for his labor.

CHAPTER VI.



THE CURRANT.

NATURAL FAMILY GROSSULACEÆ.

RIBES.—THE CURRANT AND GOOSEBERRY.

[French name, *Groseiller commun*; German, *Gemeine Johannisbeere*; Dutch, *Albesseboom*; Italian, *Ribes rosso*; Spanish, *Grossella*.]

GENERAL CHARACTERS.

Low, deciduous shrubs, with smooth stems; leaves variable, more or less lobed, in some species nearly heart-shaped; flowers small, greenish-yellow in the commonly cultivated varieties, in others yellow, crimson, or white.

SPECIES.

Ribes prostratum.—Fetid Currant.—Stems reclined; leaves deeply heart-shaped, five to seven-lobed, smooth; fruit pale red. In cold, damp woods in most of the Northern States.

Ribes floridum.—Wild Black Currant.—Leaves sprinkled with resinous dots, slightly heart-shaped, three to five-lobed, doubly serrate; fruit round-ovoid, black, smooth, with a slight musky flavor; leaves also scented. Common in low grounds throughout the Northern States and Canadas.

Ribes rubrum.—Red Currant.—Stems straggling or reclined; leaves somewhat heart-shaped, obtusely three to five-lobed, downy beneath when young; racemes from lateral buds distinct from the leaf buds, drooping; calyx flat, greenish or purplish; fruit globose, smooth, red. In cold, damp woods and bogs from New England to Oregon. Native of Europe, and probably the same species as our common Red and White Currants of the gardens.

Ribes aureum.—Missouri Currant.—Stems very strong, erect, with light colored bark; leaves deeply and irregularly lobed, usually more or less toothed; flowers yellow, in clusters or short racemes; fruit large, globular, black, violet or deep yellow. Native of our Northwestern States and Territories.

Ribes sanguineum.—Red Flowering Currant.—Native of the Rocky Mountains and California. Cultivated for ornament. Fruit more or less insipid; not valuable as an edible fruit.

Ribes nigrum.—Black Currant.—Leaves three to five-lobed; racemes loose; flowers greenish-white; calyx often of a rich brownish color; berries globular, smooth, black; leaves and fruit strongly scented. Native of Northern Europe, even to the sub-Alpine regions of Siberia.

Many other species of Currants are known, but as we have no varieties of them cultivated for their fruit, I have not thought it advisable to describe them. Those species found in Mexico, Chili, Straits of Magellan, and other Southern countries, would probably not be hardy in the United States.

HISTORY.

The species of the Currant, from which our cultivated varieties originated, are probably native of Northern Europe, as we do not find them mentioned by any of the old Greek or Roman writers, who were generally so particular to name every fruit known in their day.

The English name Currant, or Corrans, as they were formerly called, was given them, because of their resemblance to the little Zante Grape, which is called Corinth in the English markets, as it was formerly almost entirely imported from Corinth.

The Black, Red and White Currant, although known to the inhabitants of Northern Europe for centuries, attracted very little attention until within the past hundred years.

Turner, in 1557, does not name them in his list of cultivated fruits. Gerarde, in 1597, calls the Currant a smooth-stemmed Gooseberry. The Black Currant was formerly known as the Squinancy berry, because used to cure the quinsie.

The people of Siberia use the leaves of the Black Currant for making a drink, the same as we use tea. Loudon says that the leaves, when dried, are an excellent substitute for green tea, and that few persons can detect the difference. The Red, White and Black Currants, one variety of each, were the only kinds known in cultivation until the beginning of the present century. Since that time considerable improvement has been made, and numerous varieties introduced.

PROPAGATION.

BY SEEDS.—This method is seldom employed, except for the purpose of producing new varieties. The fruit should be gathered when fully ripe, always selecting the largest berries, and from the earliest and mildest flavored kinds, as the Currant being naturally a very acid fruit, the aim should be to produce sweeter varieties.

The berries may be dried, and the seeds preserved in the pulp until wanted, or be crushed and the seeds washed out, as recommended for Strawberries. They will grow more readily if not allowed to become dry, although drying is not so injurious to them as it is to many other seeds.

The following plan is one that I have followed with success :

Gather the fruit when ripe and wash out the seeds, then mix them with pure sand, and put in boxes or pots, and bury them in a shady place, such as the north side of some building or fence, where they will remain cool or frozen until the ground, in which they are to be sown, is in a condition to receive them. If they are placed in a situation where the sun will reach them, they are very likely to germinate either during winter or as soon as the frost leaves them in the spring, often before the ground will admit of their being planted. If the seeds are frozen after they have sprouted, it will usually destroy the germ and prevent further growth. With many persons the cause of failure in growing the Currant and Gooseberry from seed is, that they either place them in a situation where they sprout and cannot grow, or where too warm and wet, and when the seeds are taken out to be sown in spring they appear to be sound, yet their vitality is gone.

The seeds of all the species of *Ribes* will germinate at a very low temperature, and if we keep them moist, and where they do not freeze, they are very liable to start before the open ground is in a condition to receive them. The seeds may be sown immediately after being taken from the fruit, but in sections of the country where the weather is very changeable, and the ground is frequently frozen and thawed, there is more or less danger of injury from causes above stated. If the seeds are kept dry during winter, they should be soaked in warm water for two or three days before sowing.

Sow in single or wide drills, covering the seed one-half of an inch deep with fine soil. Keep them clear of weeds, and if the weather is dry, give them occasionally a good soaking with water.

Transplant, when one year old, into rows three feet apart, and the plants two feet apart in the rows.

PROPAGATION BY CUTTINGS.—Cuttings of the ripe wood may be made at any time, from the falling of the leaf in autumn until the plants commence growth in spring. But when the best possible results are desired, they should be taken off as soon as the wood is fully ripe.

Select good strong wood of the present season's growth, and make the cuttings about six inches long, cutting them off smooth, just at the base of a bud. Figures 87 and 88 show two cuttings (much reduced in size) as prepared for planting. Figure 81 is a cutting of the common Black Currant, and figure 82 a cutting of the Cherry Currant. The first has much larger and more prominent buds than the latter. If all the buds, except two or three of the upper ones, are cut out before setting, the plant will not produce as many suckers as though they were allowed to remain. The advisability of this plan will depend entirely upon the manner in which the plants are to be grown, whether in tree or stool; if in the former, disbud, if not, plant them entire.

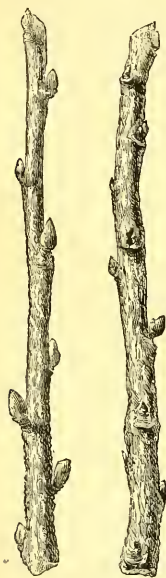


Fig. 87. Fig. 88.

When the cuttings are prepared, plant as directed for other ripe wood cuttings, in chapter 11. The cuttings should be covered with straw or some similar material, sufficient to keep out the frost, or, at least, to prevent the ground from frequently freezing and thawing during winter. Remove the covering at the return of warm weather, or enough of it to allow the young shoots to grow through without hindrance. Cuttings planted early in fall will usually become rooted by the time winter sets in, and this too, without their buds pushing into leaf. The next season they will make a far better growth than if their

planting is deferred until spring. Fall planting of Currant cuttings is practiced by most of our leading nurserymen of the present time, especially by those whose nurseries are upon soils or in sections of the country where the Currant ripens its wood early in autumn. The cuttings may be made in the fall; if it is not convenient to plant them then, they may be tied in bundles, and buried in the open ground or cellar until spring—but as the Currant is one of the earliest plants to show its leaves, the cuttings should be planted as early as possible.

When a variety is scarce and valuable, the cuttings may be made very short,—two or three inches in length will answer the purpose, but they require a little more care in handling and planting, as well as keeping the ground moist, until they become rooted.

Another method is to make cuttings of one bud, with a small portion of wood attached, say half an inch above the bud and the same below, planting in pots or boxes of sand or sandy loam, laying the cuttings down with the eye or bud on the upper side, covering them about half an inch deep. After the cuttings have been placed in the soil, the pots should be set where the temperature will not be above fifty, and keep moist for a few weeks, until the callus is formed. Then put them in a propagating house or hot-bed, where they will receive a steady heat, but not above 75 or 80 degrees. As soon as well rooted, pot them off into small thumb pots, and after these have become well filled with roots, either shift into larger ones or plant into the open ground, being careful not to break the ball of earth which contains the roots.

The single bud cuttings will sometimes grow quite readily if planted in the open ground, provided the surface of the soil above them is covered with a mulch—sawdust or tan-bark are better for mulching the cutting-bed than straw or leaves.

The Currant may also be grown very readily from green

cuttings taken from the plants as they grow in the open ground. They should be taken off as soon as the plants have made a growth of two or three inches. Slip off the young growth close to the old wood, and plant the same as other green wood cuttings in a frame, propagating house, or under bell-glasses.

These green cuttings require but a moderate degree of heat, and will often succeed in a half shady situation in the open ground if covered with glass. It is better, however, with very rare kinds, to take up the plants in fall, and put them in a pot and set in a propagating house; then take off the young wood, as soon as it is large enough for cuttings; in this manner every shoot that appears can be made a strong plant by spring.

PROPAGATION BY SUCKERS.—This was formerly a more common method of propagating than at present, but plants produced in this manner are not usually as good as those from cuttings. The suckers that spring from the roots are slipped off close at their base, and then planted out, as usual with other plants.

PROPAGATION BY LAYERS.—Branches, when bent down and covered with soil, or even pegged to the surface and then covered with a mulch, will readily take root.

The spring is the best time to perform this operation, because the layer will become well rooted by autumn. Leave the end of the branch uncovered, only burying that portion on which it is desirable to produce roots.

In the fall, separate the layer from the parent plant, and heel-in until spring. Cuttings grow so readily, that the last two named methods of propagation are but seldom practiced with the Currant.

SOIL AND CULTIVATION.

The Currant is a plant that possesses great vitality, and will grow in almost any kind of soil or situation, but to bring it to perfection, and make its culture profitable, it

requires good culture, and a deep rich soil. It succeeds better in a heavy loam, approaching a clay, than in a light sandy soil. But, whatever the character of the soil, two things are important for producing the best results,—a deep soil and a rich one. It being what may be called a gross feeder, manure of almost any kind may be applied with impunity, and in almost any quantity.

To a few persons this may seem to be a singular recommendation, inasmuch as we usually see, in traveling through the country, Currant bushes growing in the fence corners, or in rows where the grass has taken possession of the soil and formed a tough sod about the plants, and still they live and bear fruit. Yet, while I admit that the Currant will live under such treatment, and in quite poor soils, it never produces as large or as much fruit as when it has good culture and a rich soil.

For field culture the plants should be set in rows four or five feet apart, and about four feet in the row.

Clean cultivation is required as with other plants, and if the whole surface of the soil is covered with mulch during summer, it will not only insure the maturing of the crop, but will materially increase the size of the fruit.

North of the latitude of New York City, there is but little trouble in obtaining a full crop of Currants almost every season, but South of this, and particularly on sandy soils, the dry weather often begins so early that the plants ripen, and the leaves fall before the fruit comes to maturity. Deep rich soil and mulching are the best methods for preventing this.

PRUNING AND TRAINING

The most common modes of training are what is termed the bush or stool form, and the tree shape. To grow the bushes in the stool form, it is only necessary to set out the plants singly, and allow them to throw up suckers from the main stem or roots, which all the varieties

and species do quite readily. The young shoots may be shortened or entirely removed, for the purpose of giving the bush a regular shape, and make it open or compact, as desired.

The varieties of the *Ribes rubrum*, to which species our common Red and White kinds belong, are usually grown in this form, especially when cultivated in large quantities, and for market purposes.

The fruit is mainly produced on the wood two or more years old, and when a branch has borne two or three crops, it is best to remove it and allow a new one to take its place, as young wood generally produces larger fruit than that which is very old.

About all the pruning that is necessary is to cut out, occasionally, the old wood, and shorten the most vigorous of the young growth.

If too many young shoots or suckers appear, and they are likely to become crowded, a portion of them should be cut out, so that the air and sun may have free access to those that remain.

All dead or diseased shoots should be annually removed, and only the best and most luxuriant ones preserved. If the ends of the growing shoots are pinched off during the summer, it will cause them to become more stocky and fully ripe, while at the same time it will increase the size of the fruit which may be on the branch below.

The main object should be to properly develop every portion of the plant, and this cannot be done if it becomes crowded, either with old or new wood.

A half dozen large, vigorous shoots will give more and larger fruit than double that number of weak and immature ones.

When the plants are to be trained with single stems, the system should be commenced with the cutting, dis-budding that portion which is placed below ground, and when those above ground push, rub off all but one, and

train that erect; the next season cut it back to within a foot or eighteen inches of the ground. Allow three to six shoots to grow the second season, and at equal distances around the stem, if possible. The third season, shorten these branches, and allow six to twelve shoots to be produced, and so on from year to year, pruning out and heading in, keeping the head open and the branches arranged in a vase form, or as near it as convenient. In some soils single stem plants will live and produce abundantly for eight to ten years, and while young, the fruit will be larger than when grown in thick, compact bushes. For amateurs the single stem system is a very convenient and pretty method, and if a plant fails, it may be replaced without any particular loss, but for field culture I prefer the clump or bush form, because it is less trouble, and there is danger of the plants being killed by the Currant Borer, for if one of these gets into the single stemmed plant it destroys it, and a new one must be planted or trained up from one of the many suckers which will usually start from the roots after the main stem has been removed.

With the Black Currant the case is somewhat different; being naturally a much stronger grower, the stems becoming quite large and coarse, they will live for many years, and there is but little danger of insects injuring them. Neither do these require so much pruning as other varieties; still, enough should be done to give the bush a regular, open head, as well as to cut out all small, weak shoots. The young, one year old shoots should not be shortened so severely as with other varieties, unless it is necessary for the purpose of giving the plant some particular form, because fruit is produced on the one year old wood as well as upon small spur-like shoots on the old. The varieties of the *Ribes nigrum*, (European Black Currant,) and the *Ribes floridum*, and *R. aureum*, form much larger bushes than any of the other species; consequently they should be allowed more room. If planted in rows, they should

be five to six feet apart, if it is desirable to have them grow to full size, although they are readily kept within a much less space, but much fruit will be lost by severe pruning. These coarse-growing species usually produce better and larger fruit on old plants than on the young, provided they are given good culture, and all little, weak shoots are annually cut out, so that those remaining will be fully developed.

The tree form is preferable to the bush or clump for all the varieties of the species last named.

INSECTS AND DISEASES.

It is only within the past twenty or thirty years that insects injurious to the Currant and Gooseberry have become so numerous as to attract much attention. In 1847, the late Dr. Asa Fitch, in his Report as State Entomologist of New York, mentioned an insect which had become very destructive to the Currant in the central part of the State, and as it somewhat resembled the European Currant and Gooseberry moth (*Abraxis grossulariata*), he referred this American pest to the same genus, and named it *Abraxis ribearia*. In figure 89, at the upper right-hand side, is shown the male moth, and at the left the female, while on the leaf above is shown the caterpillar, as seen when feeding. Another of these caterpillars is seen suspended from the edge of the leaf, as they appear when letting themselves down to the ground, while below is its pupa, in which form this insect passes through the winter. Recent investigations by other entomologists show that this insect is a native of North America, and not of Europe, as at one time supposed. Furthermore, Dr. A. S. Packard considers the insect to be sufficiently distinct to be separated from *Abraxis*; and he has placed it in a genus to which he has given the name of *Eufitchia*, in honor of its first discoverer, Dr. Fitch; consequently its scientific name becomes *Eufitchia ribearia*, instead of

Abraxis. But the changing of its name has no effect upon the habit of this pest, and it will probably continue, as formerly, to strip the leaves from our Currants and Gooseberries, whenever left to have its own way. The insect usually appears early in spring, feeding upon the leaves, and is then readily destroyed by dusting powdered



Fig. 89.—CURRANT WORM (*Eufitchia ribearia*).

White Hellebore over the plant, while wet with dew in the morning. Tobacco water and lime, and similar applications are also used with good results, but the hellebore is considered the most effective and certain.

Imported Currant Worm.—This pest is the *Nematus ventricosus*, Klug, a large fly, of the order *Hymenoptero*, and family *Tenthredinidæ*. There are very few insects

of this order that injure our garden plants, but the one under consideration is an exception to the general rule. It first appearance in this country was about 1857, and in the vicinity of Rochester, N. Y., and is supposed to have been introduced with imported plants.

The flies come out of the ground early in spring, and the females soon commence depositing their eggs on the underside of the leaves near the veins. The eggs hatch in about a week, and immediately commence feeding upon the soft part of the leaves. At each moult they change color, but when fully grown they are about three-quarters of an inch long, and of a grass-green color, with minute black spots scattered along the sides and on the back. When mature, they drop to the ground and hide under the leaves, enclosing themselves in thin oval cocoons. In the course of five or six weeks a second brood of the flies appear, and go the same round of devastation as the first one, unless checked or destroyed by application of hellebore or similar insecticides. Hellebore is usually applied while the fruit is green, and any that may remain upon the fruit is washed off by the rain ; should any adhere to the ripe fruit it must be washed off.

The Native Currant Worm.—This is a closely allied insect to the last, belonging to the same order and family, but to another genus. It is the *Pristiphora grossulariæ*, Walsh. Its habits are also similar to the imported worm, and it may be destroyed with similar insecticides.

Trochilium tipuliforme.—European Currant Borer.—This is quite common in the Eastern States, and we seldom receive Currant bushes from Europe that do not contain more or less of these pests. It is too well known to require a description. The moth is probably not so familiar, and I give the description given it by Dr. Fitch, in the New York Agricultural Report, 1859: “A small moth, having some resemblance to a wasp, its wings being clear and

glossy, the fore pair opaque, yellowish at the tips, with a black margin and band near the middle, and the abdomen black, with three yellow bands situated one upon each alternate segment; width 0.65 to 0.85."

Trochilium caudatum.—Harris.—This species infests our native wild Currant, (*Ribes floridum*,) and it resembles somewhat the European species.

To destroy these borers, the plants should be examined every fall or during winter, and every shoot that has a borer in it will usually be of a brown color, or slightly wilted; sometimes, when the shoots are very vigorous, no difference can be observed, but by close inspection the small hole where the worm entered can be found. All shoots containing worms should be cut out, and the worm destroyed. In this way they may be checked, if not entirely eradicated.

In making cuttings, the same care should be given, and every hollow stem examined for borers, and if found, destroyed.

VARIETIES.

NATIVE SPECIES.

American Black.—*Ribes floridum*.—Fruit medium, roundish-ovoid, black; clusters small, tapering. Seldom cultivated, but worthy of it, if for no other purpose than to produce new varieties, as it is naturally a better flavored fruit than the European Black Currant.

Deseret.—*Ribes aureum*.—Fruit very large, round, black or dark violet, with a slight bloom, sub-acid and agreeable flavor; flowers yellow; a strong and rapid grower, and very productive when the plant attains its full growth. A variety of the Missouri Currant (*Ribes aureum*). It is highly valued by the Mormons at Salt Lake City, from whence I received it a few years since. This

should become the parent of a new and valuable class of



Fig. 90.—LEAF OF DESERET.

Currants, as it possesses many good qualities and few defects. Figure 90 shows a leaf of this variety.

Golden.—Large, round, deep golden-yellow, very acid, and slightly bitter; flowers yellow. Of no value for its fruit, but might be improved. Native of the Rocky Mountains, and a variety of *R. aureum*.

Missouri Black.—Very large, jet black, hard, dry, and

bitter; of no value, except as an ornamental shrub; flowers yellow, fragrant. There is another resembling this, except that the fruit is edible, but not very good. All the varieties of the *R. aureum* have deeply lobed

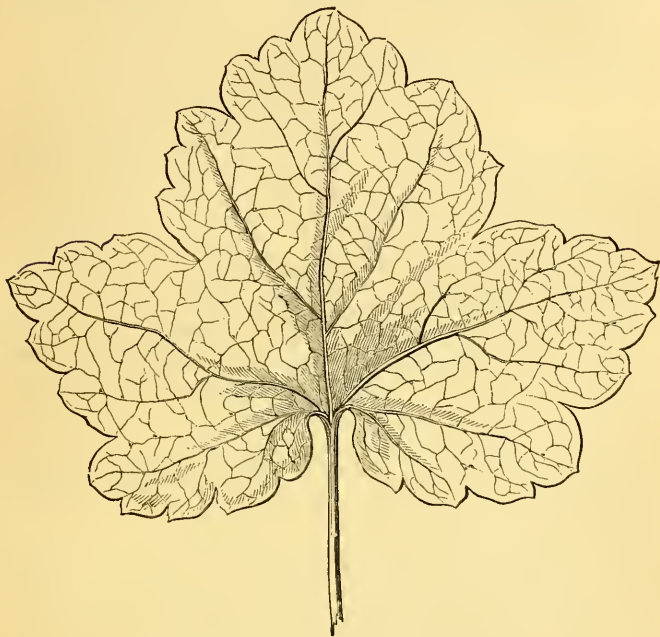


Fig. 91 —LEAF OF RIBES SANGUINEUM.

leaves, while the *R. sanguineum*, (Red Flowering Currant,) which is found west of the Rocky Mountains, has leaves of the form shown in figure 91.

Sweet Fruited Missouri.—Large, black, roundish-ovoid; bunches small, containing few berries; sweet, musky flavor. A variety of *R. floridum*, and not of the *R. aureum*, as its name would indicate. It is a very slight improvement upon the common wild Black Currant, which may be found in almost any low, moist woods.

The Mormons claim to have several valuable varieties native of the Salt Lake region, but whether they will prove valuable or worthy of being extensively cultivated is very uncertain. There is one thing quite certain, and that is that we have native species that possess qualities equal, if not superior, to those found in any other country, and equally susceptible of improvement.

FOREIGN VARIETIES.

Before proceeding to describe the different kinds, I will give a brief synopsis of the difficulties that I have met in endeavoring to ascertain which were distinct varieties.

It is well known that plants of similar kinds often become intermingled through the carelessness of workmen. Sometimes packages will become broken while being transported from one portion of the country to another, and several kinds become mixed together. Thus it will be seen that mixed varieties become very common from accidental causes.

Twenty-five years ago I commenced collecting the various kinds of Currants with the express purpose of ascertaining their true merits, and to determine which were really distinct varieties.

To do this has cost me infinitely more labor and money than I shall be likely to receive from the proceeds of this volume, and still I fear that the results will be less satisfactory to the public than any other portion of the work.

I have not depended upon varieties obtained from any one source, either in Europe or America, but have gathered them from the best nurseries of France, Prussia, Germany, England, Ireland, and the United States.

In the prosecution of my labors and researches, I have had the good fortune to be able to avail myself of the invaluable experience and extensive collection of Mr. Chas. Downing. His experience extends over a period of more

than fifty years, and when, a few years since, I informed him of my purpose of writing this book, and requested his assistance particularly upon the Currant and Raspberry, he cheerfully took hold of the work, and in addition to his then very complete collection, he sent to the different growers of Europe and of this country for specimens of all the new, as well as old varieties. Not depending upon one importation, he has obtained a new set almost every year, and by keeping them separate, we have had an opportunity of determining which were really distinct varieties. For a number of years we have met, at the time the fruit was ripe, and gone over the entire collection, carefully comparing them, and the following list is the result :



Fig. 92.—LEAF OF ATTRACTOR.

Attractor.—Large, yellowish-white ; bunch medium, loose. A slow grower, but quite productive. Not equal

to the White Dutch in flavor. The leaves are small and deeply lobed or toothed, as shown in figure 92. From France.

Buist's Long-Bunched Red.—Large, deep red, of similar flavor as the Red Dutch; leaves large and very thick; serratures sharp-pointed; a strong and vigorous grower, and very productive. Originated with R. Buist, Philadelphia, Pa. **Champagne.** (*Pheasant's Eye*,

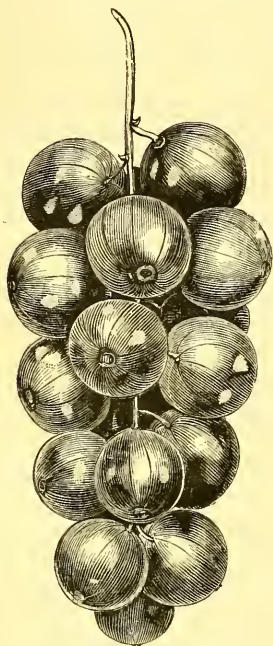


Fig. 93.—CHERRY CURRANT.

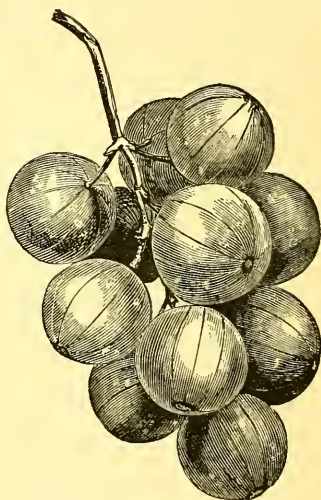


Fig. 94.—CHERRY CURRANT.

Grossellier a Fruit couleur de chair.)—Large, pale pink or flesh color, quite acid, and not rich flavored; bunches medium, loose, slightly tapering; vigorous and productive. Much admired for the pretty appearance of its fruit. Ripens late.

Cherry. (*Imperial Rouge*, or *Red Imperial*, *Large Red Angers*, *La Caucase*, *Fertile d'Angers* of *Leroy*, *Irish Grape*, *Macrocarpa*, *Napoleon Red*.)—Very large, dark

red, acid, not rich, only second rate; bunch variable, from short to quite long, scarcely tapering, figure 87, and figure 88 showing the variations on the same plant; leaves large, deep green, bluntly lobed, thick and tough; very distinct from the Red Dutch and its varieties. Plant a coarse grower, the young shoots being very strong and stocky; very productive, but the old branches becoming naked, often produce two or three crops. The largest Red Currant in cultivation, and commands the highest price in market. Some of the varieties placed as synonyms of the Cherry were probably raised from seed, but as I have not been able to discover wherein they differ, I think it folly to call them by different names.

Versailles.—Very large; bunch, long, and slightly tapering; dark red, acid, and by many it is considered to be a better flavored variety than the Cherry, but by others very similar, if not identical.

The principal points of distinction claimed are, that the Versailles is not so acid as the Cherry, and that the bunches are more tapering. But like variations may be observed in other well known varieties, and upon plants growing in close proximity. At one time, I thought that there was a difference in the growth and foliage of the two kinds, but more experience has not confirmed me in this opinion.

Although I am not ready to say positively that there is no distinct variety to which the name of Versailles belongs, still I have not as yet been able to obtain one in which really distinct and permanent variations can be discovered.

Since writing the above, thirteen years ago, I have continued my investigation in regard to the identity of these two varieties of the Currant, without making any discoveries which throw light upon the subject. I have noticed, however, that several European authorities have declared the Versailles to be identical with the Cherry, a conclusion which I arrived at some fifteen years ago.

Dana's White.—After various attempts to procure a White Currant under this name distinct from the White Grape, I at last procured a few plants from Mr. Dana, but with no better success, as all proved to be the same.

Fertile de Palluan.—Large, and of same color as Red Dutch, but not so juicy or good. A strong and vigorous grower, and very productive. The leaves resemble the Red Dutch, but are larger. Figure 95.

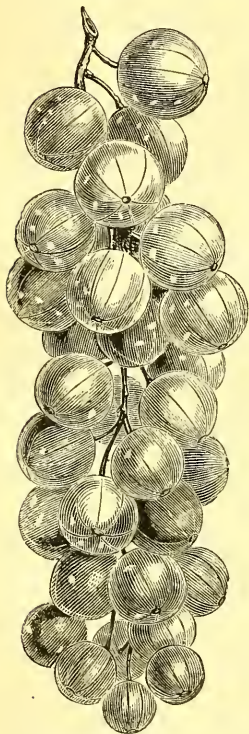


Fig. 95.—FERTILE DE
PALLUAU.

Gondouin Red.—Berry and bunch medium size; fruit light red, of rather poor flavor; foliage large, coarse, light green; serratures of leaf sharp, coarsely veined, upper surface slightly wavy. A very vigorous grower, and may prove to be the Red Provence.

Gondouin White.—I have been unable to obtain a distinct variety under this name, White Grape being the one usually received.

Gloire des Sablons.—Fruit and bunch small, white, distinctly striped with red, acid, poor flavor; of no value, except as a curiosity; plant a strong, upright and vigorous grower, not very productive.

Gros Rouge d'Angers. (*Large Red Angers.*)—See Cherry.

Holland Long Grape.—The one received from L. Leroy, of France, is the Victoria, and one from Andre Leroy, the Red Provence.

Imperial Yellow. (*Imperial Jaune, White Imperial.*)—Identical with the White Grape, with perhaps a slight

difference in the growth of the plant. It appears to be a more stocky and upright grower, at least while young.

Imperial Rouge.—See Cherry Currant.

Knight's Large Red.—Very similar to, if not identical with, the Red Dutch.

Knight's Early Red.—Same as the last, and no earlier.

Knight's Sweet Red.—Large, very dark red; bunch long, tapering; similar in quality to the Red Dutch, but apparently not quite so acid; growth vigorous, upright leaves dark green, of medium size, thick and coarsely serrate. The general appearance of the plant distinct from the Red Dutch. Moderately productive. This may have been received under the wrong name, and perhaps it is the Knight's Large Red, which, Rivers says, is a valuable variety.

La Hative. (*La Hative de Bertin, La Fertile.*)—I am not certain which of the above names should be placed first, although the varieties received under each have all proved to be the same. Evidently nearly related to the Cherry Currant, as the general appearance of the plant resembles it very much, but of a less vigorous growth. Color of fruit and form of bunch same as Cherry, but only about two-thirds the size; ripens a few days earlier, and is not quite so acid, yet too much so to be called good; productive.

Prince Albert.—Large, light red, sometimes slightly striped with dark red; bunch medium, tapering; rather acid, firm, of inferior quality, moderately vigorous, upright; leaves small; lobes long, pointed, sharply serrate very productive.

Red Dutch. (*Large Red Dutch, New Red Dutch, Long Bunched Red, Morgan's Red, Grossellier Rouge a Grosse Fruit.*)—Large, deep red; bunches long, tapering, rich, juicy, good. One of the best. A vigorous, erect grower and very productive. Well known.

Red Grape.—Large, dark red; bunch compact, long, slightly tapering; foliage medium, not shining, as with Red Dutch; moderately vigorous, and of a rather stocky growth.

Red Provence.—Small, dark red; bunches long; very acid, liable to rot before ripening, quite late, altogether inferior; the young shoots red. A very rampant, coarse grower.

Striped Fruited. (*Grosse Weiss- und Rothgestreifte Johannisbeere.*) —An old variety, with fruit same as Gloire des Sablons, but the plant a short, stocky grower; the terminal buds on the young shoots quite conspicuous. Of no value.

Transparent White.—Claimed to be a seedling of White Grape, but, if so, it has assumed all the characteristics of its parent, and I am unable to see any difference.

Versailles.—See page 205.

Victoria. — (*May's Victoria, Houghton Castle, Raby Castle, Goliath, Wilmot's Red Grape, and Red Grape* of some nurseries.)—Large, light, bright red; bunch (figure 96) very long, often six or seven inches, tapering; sprightly acid, good flavor; leaves medium, rather thin; lobes long; serratures rounded, or with a short point; young branches rather slender, although vigorous, spreading; very productive. A valuable variety for home use.

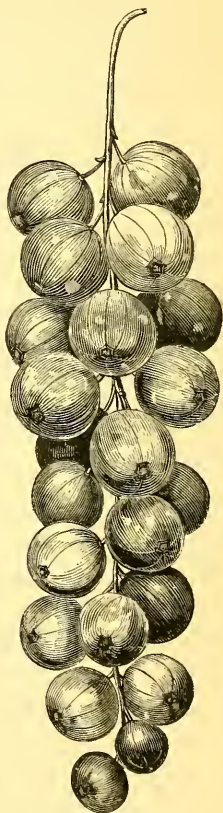


Fig. 96.—VICTORIA.

White Grape. (*White Antwerp, White Transparent.*)

—Large, yellowish-white, transparent; bunch medium, slightly tapering (fig. 97); juicy, sweet, rich; the best White Currant; moderately vigorous, slender, spreading habit; leaves medium size, sharply serrate, with a grayish green color, not shining; very productive.

White Dutch. (*White Clinton, New White Dutch, Clarke's Sweet, White Crystal, Reeves' White, Morgan's White, White Leghorn, White Transparent, White Holland, White Pearl.*)

—Large, yellowish-white, but quite transparent; bunches a little shorter than the Red Dutch, and berries larger, sweet, rich and good; a vigorous, upright grower, and very productive.



Fig. 97.—WHITE GRAPE.

White Provence. — Very large, yellowish-white; bunch rather short, tapering. About the same in quality as the White Dutch, but not quite equal to White Grape. The most vigorous of all the White varieties, evidently of the White Dutch class. Leaves large, thick, more or less edged with white, as shown in figure 98; productive, but not equally so with the White Grape.

BLACK CURRANTS.

(*Ribes nigrum.*)

Black English. (*Common Black, Bang-up Black, Cassis a Fruit noir.*)—Large, black, but few in a cluster.

Well known, and but little cultivated at the present time, having been superseded by the following:

Black Naples. (*Cassis Royal of Naples*.)—Very large, often three-fourths of an inch in diameter, black, sweet, but of musky flavor; clusters are medium, tapering, loose;



Fig. 98.—LEAF OF WHITE PROVENCE.

very vigorous grower, and productive, when the plants have attained considerable age and size; leaves, stems and fruit have a rank and musky scent, which is very disagreeable to many, but to others delightful.

Black Grape. (*Ogden's Black Grape*.)—Fruit same

as Black Naples, but the bush is more stocky, and not so tall a grower. A marked difference may be observed in the height of the plants when growing in adjoining rows.

Brown Fruited. (*Green Fruited, Russian Green.*)—A variety of the Black English, with greenish-brown fruit; berries hard, dry, and rank flavored. Not worth cultivating.

Lee's Prolific.—A new sort, of great promise. Berries large, in compact clusters; very similar in quality to the Black Naples, but the plants far more productive.

PROFITS OF CULTURE, USES, &c.

Currants are not, as a general thing, consumed in as large quantities as some other kinds of our small fruits. Still there is scarcely a garden, however small, in city or country, in which a few Currant bushes are not cultivated.

The extreme acidity of our more common varieties is probably one reason why larger quantities of them are not used in their natural state. Currant jelly is one of the indispensable preserves of which no good housekeeper neglects to lay by a store at the proper time, but it has not been known as an article of commerce until within a very recent period.

Our markets, as a general rule, have been very well supplied, and often the price obtained for Currants has been far below a profitable point. But of late years, since our great fruit-preserving establishments have been started, the demand has increased, and the supply is falling behind. Here let me mention a fact which, I fear, some of our fruit growers, as well as others, do not fully understand, and it may also explain why the prices of certain kinds of fruit appear to increase in exact ratio to the supply. It is this: When the proprietors of one of these large establishments can go into market and purchase fifty thousand baskets of Strawberries, Raspberries, or other similar

fruits, he can afford to make a specialty of that one kind for one, two or more days, engaging the entire apparatus and force of his establishment upon it; but, if only a few hundred baskets can be obtained at any one time, then it will not pay him to attempt to preserve any. Thus it will be seen that we may supply or glut a market with a few hundred baskets or pounds of a particular kind; when, if the supply was thousands of baskets, or tons instead, there would soon be a scarcity. Just as soon as it is known that any good kind of fruit can be had in abundance, there will be means found for disposing of it, and usually at a better price than when there is a comparative scarcity. Capital is usually drawn into channels where it can be employed continuously as well as profitably. Gail Borden's process for condensing milk has been successfully applied to the juice of the Currant, and a similar substance to the common jelly manufactured without sugar, and at less than half the cost. In the condensed form, Currant juice may be transported to any portion of the globe, and become an article of commerce. When water is added, it again becomes a liquid—valuable for medicinal purposes, as well as a luxury. Vessels starting upon long voyages would do well to lay in a supply of this article, for there are many diseases which are more or less prevalent on ship-board, particularly when in tropical climates, in which a free use of Currant juice would be, at least, beneficial to the patient, if not a curative.

The red Currants are more generally used for making jellies than the white, but why, it would be difficult to tell. Perhaps it is like many other anomalies we observe in market, the cause of which can only be attributed to a more general acquaintance with the kind, or to an attractive color. The white Currants, as a class, are of a richer flavor and less acid than the Red.

The Black Currants are not so acid as the red and white varieties, but their strong musky flavor is not, as a

rule, agreeable to the American taste; yet, like many other fruits of strong flavor, it gradually becomes less objectionable, until at last, through familiarity, a taste for it is *acquired*, and then it is appreciated and valued as highly as any other. Every year there appears to be an increasing demand for the Black Currants, and the time will soon come, if it has not already arrived, when they will command full prices and be sold in large quantities. Currant wine made from the different kinds is a well known article but whether its manufacture should be encouraged, or otherwise, I will leave to the temperance societies to decide. The price of Currants in our eastern markets varies from four to fifteen cents per pound; usually the largest and best varieties will bring ten cents at wholesale. At the last named price, four to six hundred dollars per acre can be obtained.

In planting the common red and white kinds, four feet each way is sufficient, thus giving 2,722 plants per acre. If we estimate our crop at two pounds per plant, which is not one-half the amount they should produce when fully grown, we will get 5,444 pounds per acre, or over two tons and a half, and at two hundred dollars per ton it amounts to over five hundred dollars. Then we have the gathering, shipping, cultivation, and other incidental expenses to deduct therefrom. But even then it can be seen that it will be a very profitable crop. In case of great abundance the prices might be somewhat reduced, but by good cultivation the crop may be double the estimate given above.

The Currant possesses many good qualities to recommend it; among which are its perfect hardiness, early culture, great productiveness, and almost the certainty of a full crop every year.

CHAPTER VII.

GOOSEBERRY.

NATURAL FAMILY GROSSULACEÆ.

[*Ribes Grossularia*, of Botanists; *Ribes Uva Crispa*, of Linnæus; *Grossailler*, of the French; *Stachelbeere-strauch*, German; *Uva-spina*, Italian; *Grossella*, Spanish; *Kruisbes*, of the Dutch.]

GENERAL CHARACTER.

Low, deciduous shrubs; stems mostly bearing thorns at the base of the leaf-stalks, in some the spines or prickles scattered, usually more abundant at the base of the stems than above; leaves alternate, palmately lobed; fruit a one-celled berry, produced in small clusters, smooth or prickly.

SPECIES.

The following are indigenous to the United States, according to Dr. Gray and Chapman.

Ribes Cynosbati.—Wild Gooseberry.—Leaves pubescent; peduncles slender, two to three flowered; spines strong; berry large, armed with long prickles, like a burr, rarely smooth.

R. hirtellum.—Smooth Gooseberry.—Leaves somewhat pubescent beneath; peduncles very short, one to two

flowered; stems either smooth or prickly, and with very short thorns. Common in all the Northern States. The well known Houghton's Seedling, of the nurseries, belongs to this species.

R. rotundifolium.—Leaves nearly smooth, rounded, with very short and blunt lobes; peduncles slender, one to three flowered; fruit smooth, pleasant flavored.

R. lacustre.—Swamp Gooseberry.—Young stems with bristly prickles and weak thorns; leaves heart-shaped, three to five-pointed, with lobes deeply cut; fruit bristly. Cold woods and swamps from New England to the West and northward.

R. gracile.—Axillary spine very short; leaves on a slender petiole, pubescent on both sides; the lobes acute, incised and acutely toothed; peduncles long, one to two flowered. Mountains of Tennessee; (Chapman in Flora of the Southern States.)

There are several other species, or those described as such, but as we have no cultivated varieties of them, it is hardly necessary to give a full description. The following are but a portion of those known:

R. oxycanthoides.—Native of Canada and Newfoundland, and to the northward.

R. divaricatum.—Branches divaricate, bristly or naked; berries black, smooth. Native of Northwest coast of America.

R. microphyllum.—Small Leaved Gooseberry.—Native of the mountains of Mexico. Flowers red.

R. cuneifolium.—Berry pale red, resembles the *R. Uva Crispa*. Native of Peru, on the Andes.

FOREIGN SPECIES.

R. Grossularia. (*Uva Crispa*, L.)—Leaves three to five-lobed, rather villous; prickles two or three under each bud; branches otherwise smooth, spreading or erect;

berries smooth or covered with prickles, red, green or yellow. Native of the whole of Northern Europe, and in the woods of Britain. This species is the parent of all the noted varieties of the English gardens.

Other species are known, but not possessing merits superior to the above, no attempt has been made to improve them. The native species of America are really superior to the *R. Grossularia* in its normal state. But in England great attention has been paid to the cultivation and improvement of this fruit, consequently varieties of great size, beauty and excellence have been the result.

HISTORY.

The Gooseberry has no separate history from the Currant. It was, as we have before stated, not known as a cultivated fruit until within the last two or three hundred years. Parkinson, in 1640, mentions eight varieties, but the varieties increased so rapidly in the next hundred years, that Miller, in 1731, said that it was needless to undertake to enumerate them.

If this was true in the days of Miller, it is certainly so at the present time, because varieties have been constantly increasing ever since, until some of the English nursery-men enumerate three hundred kinds in their catalogues.

In this country very little attention has been paid to the Gooseberry, and the list of kinds grown from native species is very small, which is very much to be regretted, inasmuch as the European sorts do not, as a general thing succeed in America.

PROPAGATION.

The same methods recommended for the Currant, with one or two exceptions, are equally applicable to the Gooseberry.

As a general thing, it does not ripen its wood so early in the season as the Currant, and the planting of the cuttings may be deferred until spring.

They are, however, more certain, if made in the fall after the leaves have fallen, or when the young wood is fully mature, than if the operation is deferred until spring.

The cuttings may be buried either in the open ground or cellar, being careful not to allow them to become dry and shrivelled or too wet. Growing from seed cannot be too highly recommended at the present time, because we are in great want of varieties suited to our climate, and it is scarcely to be expected that we shall obtain them in any other way than by growing seedlings from our native species.

We have plenty of varieties which were produced from the seeds of foreign kinds, but they are neither superior in quality or size, nor any better suited to our climate than the originals.

Native varieties from native species is the field in which to labor for making permanent progress, and the general success of the few varieties that have been produced, shows the truth of this assertion.

PRUNING AND TRAINING.

The single stem system is probably the best one for training the Gooseberry. The fruit is produced on short spurs on the two and three years old wood, as well as on that of the preceding year, and the directions given for the Currant are applicable to the Gooseberry. If but little fruit is desired, and that of large size, then prune close, and leave but few branches, and the opposite course may be followed for a large crop. The Gooseberry should be trained with a very open head, more so than the Currant, because if the air does not have free access to every portion of the plant, mildew is almost certain to destroy not only the fruit, but the inside branches, if not the whole plant.

A proper distribution of the branches should be observed, and be so arranged that they shall be at regular distances from each other. Then all little side shoots, that may appear in summer, should be pruned off. The young shoots should be annually shortened, but to what extent will depend somewhat upon the amount of growth the plants have made, as well as upon the quantity and quality of fruit desired. Summer pruning, except to take out small weak shoots or to check the rampant growth of a particular branch which is attracting too much of the strength of the plant, is not beneficial, inasmuch as it often causes young, weak, lateral shoots to be produced, which often fail to come to maturity.

The Gooseberry may be trained as espaliers, or with a single stem and side spurs, or in almost any manner that one's fancy may suggest.

The regular annual pruning may be performed at any time after the wood is fully matured in the fall, until the buds swell in the spring.

SOIL AND CULTURE.

The Gooseberry likes a good, deep, moist soil, but one that is not really wet. A rich soil is also essential, because it is only by keeping up a vigorous growth that large fruit and abundant crops can be secured. An open, airy situation is better than one that is confined, and in many sections of the country the north side of a hill would be far preferable to a southern exposure. The extreme heat of our summer has been the greatest impediment to the successful cultivation of the English Gooseberries, and to counteract this, the coolest available situation should be selected. Also, in enriching the ground, use no fermenting manure; apply none but that which is old and well rotted. Cow manure is far better than horse manure, particularly on light, warm soils. Mulehng the plants in summer is very beneficial, and if tan bark or

spent hops from a brewery can be obtained, they should be used in preference to hay or straw. Good culture is required to produce good crops, the same as with other fruits.

MILDEW.—This is the one great enemy to the Gooseberry in the United States. It not only attacks the fruit, but often extends over the whole plant, effectually checking its growth.

So prevalent has this disease become, that the foreign varieties are almost universally discarded, as there are few locations where they will succeed.

There are many remedies which have been from time to time recommended, and they often appear to be effectual, while in other instances they are of no use whatever.

The following remedies against mildew are worth trying, although they cannot be called radical cures :

Scatter flour of sulphur over the bushes soon after the berries have set, and repeat the application occasionally until the fruit is ripe.

Water the plants with strong soap-suds, or dissolve one pound of potash in a barrel of water, and then sprinkle the plants once a week with it.

Soak fresh mown or dry hay in brine for twelve hours ; then cover the entire surface of the soil about the plants with this, as a mulch. If hops, tan bark, or other mulch has previously been applied, then sprinkle it with salt ; a single handful to each plant will be sufficient.

All of these remedies will often fail, but still they are worth trying. Old plants are more liable to suffer from mildew than young ones, therefore it is best to keep a supply of fresh plants always on hand ; in fact, so long as you can keep the plant growing vigorously, there is but little danger from mildew.

I have often seen the foreign varieties doing splendidly in a half shady situation, such as the north side of a wall or fence, or in the shade of trees ; but such a situation

cannot be recommended as the best, because mildew does destroy plants under just such circumstances. No effectual remedy can be given, nor the best location pointed out, because the experiences of different cultivators are so conflicting, that the one which appears to be the best in one location, would seem to be the very poorest for another. Wherever the foreign kinds will grow without being attacked by mildew, they are certainly far preferable to any of our native ones; but my own remedy against mildew is, to cultivate none but the native varieties, for with these I have never experienced the least trouble, nor as yet had a berry affected by disease of any kind.

INSECTS.

The Gooseberry and Currant are so nearly related, that many of the injurious insects are common to both. The Currant-moth, (*Abraxis*,) is equally destructive to the Gooseberry, while the Currant-borer seldom, if ever, attacks it. Harris, Fitch, and other entomologists, describe quite a number of insects that are occasionally found upon the Gooseberry, but thus far their ravages in this country have not been very extensive. The following are occasionally met, and if they should become numerous, would, at the same time, become very injurious:

Lecanium Cynosbati.—Gooseberry Bark-louse.—(*Fitch*.)—Attacking the stalks of the wild Gooseberry; a hemispheric, smooth, shining resin-brown reale, commonly freckled with dull yellow dots, and with a dull yellow stripe along its middle. Remedy, close pruning, and an application of potash dissolved in water; one pound to eight gallons of water.

Pæcilopectera pruinosa—Mealy Flata—(*Say*.)—A small four-winged fly, of a dark bluish color, covered with a mealy white powder, which attacks the leaves late in the season, puncturing the leaves and young shoots, sucking the juices of the plant.

Probably, dusting the plants with ashes or lime would destroy them, or at least prevent their attacks.

Cecidomyia Grossulariæ—Gooseberry Midge—(*Fitch.*) —“The berries turning red prematurely and becoming putrid, having in them small, bright yellow maggots, of an oblong-oval form, and slightly divided into segments by fine impressed transverse lines; changing to pupæ in the berries, and in the latter part of July giving out a small two-winged fly, resembling a musquito, of beeswax yellow color.” The berries should be gathered so soon as they show signs of premature ripening, and fed to hogs, or otherwise destroyed.

In addition to the above, and the various insects injurious to the Currant and Gooseberry, there are several others which occasionally do some harm, either to the leaves or fruit. There is a minute moth which breeds in the fruit, the caterpillar eating out the center of the berry. In wet seasons a species of Plant-Louse (*Aphis ribis*) infests the Red Currant, but does not attack the black varieties, or the Gooseberry, but none of these are very destructive, and the cultivator can usually get rid of them by the use of the simple insecticides usually at hand. Those who are familiar with the habits of insects can do much by removing the eggs, often laid in clusters, and destroying them before they hatch, and the brood is scattered.

PROFITS OF CULTURE.

There is far less demand for the Gooseberry than almost any other of our small fruits. It is generally gathered before it is ripe, and sold for making pies, tarts, etc., consequently, the demand for it is not so great as for other fruits, which are used for a greater variety of purposes.

In the New York markets, the price varies from one to three, or four dollars per bushel. But whether the de-

mand would warrant a very extended culture, is uncertain, at least. Each cultivator will have to be his own judge in the matter, and if he can be sure of obtaining two dollars per bushel, he can make Gooseberry culture profitable, at least with the native varieties. Two to four hundred bushels per acre can be grown of these kinds, and the cost of culture, gathering, marketing, etc., ought not to be over fifty cents per bushel. I have grown the Houghton Seedling, (which I do not consider the best or most profitable,) and sold the fruit for one dollar and fifty cents per bushel, and believe it was a profitable transaction.

NATIVE VARIETIES.

Cluster.—(*American Red, Dutch Joe, Pale Red, St. Clair, Roberts' Sweet Water, etc.*)—Small, oval, about three-fourths of an inch long; reddish purple; sweet, juicy, and good. Bush, a strong, slender grower; leaves light, bright green; very productive.

Cluster Seedling.—Similar to its parent, but slightly more upright in growth, and the leaves of a pale grayish-green.

Downing.—Medium to large, oval, about $\frac{3}{4}$ of an inch long; greenish-white; excellent flavor. Plant, an upright grower; leaves deep shining green; very productive; probably the best native variety.

Originated with Charles Downing, Newburgh, N. Y.

Houghton's Seedling.—Fruit small to medium, roundish-oval, pale red, sweet, tender, and very good; leaves deep shining green. The young plants upright in growth, but as they become old they assume a spreading, almost weeping habit. A vigorous and productive variety, and is seldom affected by mildew. Originated with Abel Houghton, Lynn, Mass.

Mountain Seedling.—Large, roundish-oval, pale red; skin rather tough and thick, but of fair quality. The

largest of the native varieties; often over an inch in length. Plant a coarse, spreading grower, with very strong spines. Productive and valuable.

Originated with the Shakers, at Lebanon, Pa.

FOREIGN VARIETIES.

To attempt to give a list of the best foreign varieties, would be the height of folly on my part, inasmuch as there is no dozen or more sorts upon which any two of the most experienced English growers would agree.

The number of really first class varieties known in England is almost innumerable, and a host of new ones are brought forward every season. To give some idea of the attention which is paid to the culture of this fruit in England, I will state that the Annual Gooseberry Growers' Register, for 1863, is a volume of over 200 pages, and gives reports of one hundred and fifty-five Gooseberry shows.

When the horticulturists of the United States will support as many exhibitions for the purpose of showing any one or all the small fruits combined, then we shall have no need of looking to other countries for new varieties.

Among the old varieties which have been known in this country for twenty to forty years, and are still esteemed as good as any, I will name the following:

RED.—Ironmonger, Warrington, Red Champagne, Red Walnut.

GREEN.—Green Walnut, Green Globe, Green Gage, White Smith.

YELLOW.—Golden Drop, Sulphur, Conqueror, Yellow Champagne, Hunt's, Tawny, Royal Sovereign.

WHITE.—Large Crystal, Royal George, White Dutch, White Walnut.

Among the very newest and largest varieties which have taken premiums at the great Gooseberry shows in England, I give the following twelve as the heaviest named in this record:

RED.—Leicester's Smoker, Brotherton's Foreman, Pilkinton's Farmer.

GREEN. — Prophet's Diadem, Becket's Bravo, Brotherton's Birchen Lane.

YELLOW.—Wilkinson's Oyster Girl, Eardlay's Hannah.

WHITE.—Shingler's Edna, Miss Soars, Walton's Annie.

The heaviest berry weighed 29 dwt. 12 grs.; and the lightest 16 dwt. 2 grs.

But to produce berries of the weights given requires extra care, more than probably any of our cultivators would be likely to give to the Gooseberry, even if our climate was as suitable to its culture as that of England.

CHAPTER VIII.

CORNELIAN CHERRY.—(CORNUS.)

NATURAL FAMILY CORNACEÆ.—(Dogwood or Cornel.)

[Name derived from *Cornu*, a horn, alluding to the hardness of the wood. In French, *Cornouiller*; Dutch, *Kornoelje*; German, *Kornel Kirsche*; Italian, *Corynello*; Spanish, *Cornejo*.]

GENERAL CHARACTERS.

The species constituting this genus are mainly deciduous shrubs or small trees. Flowers small, inconspicuous, but in some species they are surrounded by a large and showy involucre, which is sometimes called the flower, as in one of our native species, (*Cornus florida*). There is but one known species which produces fruit worthy of our attention.

Cornus mascula.—Cornelian Cherry.—Shrubs growing ten to twenty feet high, with smooth branches; leaves oval, acuminate, of a dull green color; flowers small, yellow, in clusters, produced early in spring, before the leaves; fruit oblong, about one inch in length and half an inch in diameter; color bright reddish-scarlet; flesh firm, slightly juicy when ripe, acid, not particularly agreeable in its raw state; fruit ripens in September, but remains a long time on the bush, which makes it exceedingly ornamental.

A variety of this species produces fruit of a bright yellow color. The fruit is a little larger than the red, and not quite so acid.

HISTORY.

The Cornel, as it is generally called in our older works on gardening, is a native of the South of Europe and



Fig. 99.—CORNELIAN CHERRY.

Eastern Asia. It is mentioned by nearly all of the ancient writers. Sometimes the fruit is named, while others praise the quality of the wood, which is very hard. That it was formerly used for arrows and javelins, we infer from the

frequent allusions made to it in connection with implements of war. Homer, in the *Odyssey*, Book xiv, says :

“His cornel spear,
Ulysses waved to rouse the savage war.”

It is also mentioned in a similar connection in Virgil's *Georgics*.

Theophrastus and Pliny are supposed to refer to it when speaking of some of the hard kinds of wood growing wild in Italy. But these writers are generally so vague in their descriptions, that it is difficult to determine what particular trees or plants they were endeavoring to describe:—

Nearly every English author, from Tusser, who, in his work written in 1557, called them Cornel Plums, down to the present time, have mentioned the Cornel. Some eulogize the beauty as well as quality of the fruit, while others refer to it as merely an ornamental plant. The name *Mascula* or *Mas* was given it from the fact that plants grown from seed produce only staminate or male flowers for the first ten to fifteen years; afterwards flowers of both sexes appear, followed by fruit. It appears to have derived the name of Dogwood from a wild species found in Britain, which bears a small fruit, not edible. Parkinson says this wild species was called hounds-tree, (dog-berry tree,) because the fruit was not fit for the dogs; hence the name Dogwood, which has become the common name of the whole genus. The Cornelian Cherry is not very plentiful in the United States, although nearly every nurseryman keeps the plants for sale. The long time which it requires to bring seedling plants into bearing, has been one reason why we see so few in private gardens.

In the older nurseries and gardens near our eastern cities, bearing plants are frequently seen, but they are not so common as their merits deserve.

The plants live to a great age, and there are specimens in Europe, which are known to have been planted more than two hundred years.

PROPAGATION.

BY SEEDS.—Plants are more generally grown from seed than otherwise; consequently, for reasons previously stated, they are a long time coming into bearing. The fruit should be gathered in the fall, and the seeds separated from the pulp; then mixed with earth, and buried where they will keep moist, and not be disturbed until the ensuing autumn. They will seldom, if ever, germinate the first season; consequently there is no use of sowing them where it is desirable to have them grow, and be obliged to cultivate the ground where there are no plants. When the seeds have remained one season in the rot-heap, (to use a gardener's phrase,) take them out and sow in drills, placing the seeds two or three inches apart, and cover two inches deep. The seedlings produce a mass of small fibrous roots, and can be rapidly transplanted in spring or autumn. If bearing plants are at hand, from which buds or grafts can be obtained, then it is better to use the seedlings as stock. In this case, they should be transplanted from the seed-beds into rows four feet apart, placing the plants about a foot apart in the rows. The seedlings will usually be large enough to work the third year.

CUTTINGS.—These should be made of the one year old wood, and in the same manner as described in the preceding chapter for the Barberry. The cuttings do not root very freely, and to insure even moderate success, the ground should be kept very moist during the early part of the season, or until roots are produced. A deep, moist soil is requisite, and if covered with mulch, so much the better.

LAYERS.—This is the most common mode of propagating from bearing plants. Put down the layers in early spring, cutting them as usual with woody plants, and they will generally be sufficiently rooted to be removed from the parent plant in autumn.

Layers do not usually make as handsome plants as seed

lings; still they are preferable, because they will produce fruit when quite young.

Budding.—This operation should be performed, in the usual manner, so soon as good, well developed buds are to be obtained from the young wood of the present season's growth.

Grafting.—This should be done in the spring, just before the leaves start, and upon young stocks, such as seedlings of two to four years old; the whip or splice graft is preferable to the wedge.

CULTIVATION.

There is no particular skill required in cultivating the Cornelian Cherry, as the plant is far from being a delicate one. It will grow in almost any good, garden soil. In England, it is said to prefer a calcareous one, but the largest and best plants, with which I am acquainted, are in a compact loam, approaching a clay. An open, but somewhat sheltered situation is preferable on account of the plant blooming so very early; the flowers are often destroyed by spring frosts, unless protected, or where there is just sufficient circulation of air to prevent freezing. A strong, direct current of air will often blast the flowers, when the same degree of cold would not injure them if the air was still, or only moved by a gentle breeze.

VARIETIES.

There are, it is said, other edible varieties besides the two which I have named, but I have no personal knowledge of their merits. There is a variegated leaved variety which I have cultivated for several years, but up to the present time it has produced no fruit.

Uses.—In former times, when better fruit was scarce, Cornels were used for various preserves and to mix with

apples and pears for making cider. It is doubtful if it will ever become a popular fruit with us, unless better varieties than those we now possess are produced. Its beauty, however, commends it to the attention of every one who possesses a garden.

DISEASES AND INSECTS.—None, or so few as not to be worth naming.

CHAPTER IX.

CRANBERRY.—VACCINIUM.

ERICACEÆ, or Heath Family.

[*Vaccinium Oxycoccus*, an ancient Latin name of obscure derivation. French name is *Mirelle*; German, *Heidelbeere*; and Mooreberric. The Sub-family name, *Oxycoccus*, is derived from *oxus*, sharp or acid, and *kokkus*, a berry, in reference to the acid taste of the berries. The name Cranberry is supposed by some authors to have been given it because the fruit stem is crooked like a crane's-bill, while others state that it was because cranes were fond of the fruit.]

GENERAL CHARACTERS.

Low, trailing, evergreen shrubs, with very slender branches; fruit-bearing stems erect; flower bell-shaped, white, or tinged with red; berry usually four to five-celled; seeds numerous.

SPECIES.

Vaccinium Oxycoccus. — Small Cranberry. — Leaves ovate, acute, with revolute margins; stems very slender; berries very small, spotted when young, becoming red at maturity. Grows in peat bogs in nearly all of the Northern States, also in Northern Europe.

V. macrocarpon. — Common American Cranberry. — Leaves oblong, obtuse, glaucous underneath, with slightly revolute margins. Flower-stems erect; fruit pale pinkish.

white to deep red, one half to one inch in diameter; variable in shape, from globular, ovoid, ovate-oblong, bell-shape, etc.

V. erythrocarpon.—Bush Cranberry.—Leaves deciduous, oblong-ovate, acuminate, bristly serrate; stems erect, flexible; two to four feet high; berry small, red, dry and insipid. High mountains of Virginia and North Carolina.

HISTORY.

The Cranberry is almost exclusively a northern plant, and was probably not known to the Romans until their conquests in the North. In Northern Europe it has been highly appreciated for centuries, and immense quantities are annually brought into the English markets from Russia and Sweden, in addition to those produced in Britain. The American Cranberry, *V. macrocarpon*, was introduced into England in 1760, and, although acknowledged to be superior to the common European species, still we have no accounts of its being cultivated there to any considerable extent.

The first settlers in America found the Cranberry in such abundance that there was no necessity for cultivating it, until the population became so numerous that the natural supply would not equal the demand. This point was reached about thirty years ago, at which time numerous experiments in its cultivation commenced at Cape Cod, and in a few other places.

Previous to this time, however, an occasional plot had been cultivated. Kenrick, in the *New American Orchardist*, 1832, says: Capt. Henry Hall, of Barnstable, Mass., has cultivated the Cranberry for twenty years. In the *New England Farmer*, Vol. IX, No. 18, is an account of a Mr. F. A. Hayden, of Lincoln, Mass., who, in 1830, sold from his farm 400 bushels of Cranberries for six hundred dollars. From these and a few other recorded instances

of Cranberry culture, we infer that there were very few who attempted its cultivation previous to 1835 or 1840. Since that time there has been a steady increase, until, at the present time, thousands of acres are devoted to the culture of this fruit. Not only have individuals turned their attention to it, but companies have been formed with abundant means to cultivate the Cranberry upon an extensive scale.

In addition to the benefit derived from having our markets supplied with the fruit, its culture is a source of national wealth, inasmuch as the land devoted to it was previously uncultivated, neither enriching individuals by its productions, nor yielding taxes to the State.

Many of our low, boggy wastes, which formerly were sources of miasmatic diseases, have been changed into healthful locations and fruitful fields.

PROPAGATION.

To propagate some of our cultivated fruits successfully, requires more or less skill, but the Cranberry may be said to propagate itself. The plant, as it creeps along over the ground, throws out innumerable roots, fixing every portion of the prostrate stems to the soil. If these branches do not root as soon as desired, a little earth thrown over them will hasten the process.

The plants may be taken up and planted whole, or be divided into small pieces, each of which will soon become a strong plant. Even the upright stems may be used for cuttings, and when planted in the spring, they will become rooted by the next fall.

The small green tips of the growing branches may be taken off in summer, and rooted under a bell-glass, or in ordinary glazed frames.

Cultivators seldom have recourse to seeds for extending their plantations, but they may be planted for the purpose of producing new varieties as well as multiplying old

ones. The seeds should be prepared and kept through the winter in the same manner as recommended for the *Huckleberry* in a succeeding chapter.

Sow them in drills and keep free of weeds, either by hoeing or mulching with saw-dust, or tan-bark, if grown on dry soils, but if on low grounds, use sand instead. Transplant into fruiting-beds when one or two years old.

PREPARATION OF SOIL.

Naturally, the common Cranberry is a semi-aquatic plant, requiring a constant supply of water to ensure its highest state of perfection. It is usually found in low peat bogs, where it is often entirely submerged in the winter months, and the roots are in contact with water during a greater portion of the year.

While this is the condition in which we usually find the wild plants, yet, occasionally, they are found upon high and dry soils. Judging, however, from the position in which we find the greatest quantities, we conclude that a wet soil is the most natural one. If we leave the normal condition of the plant out of the question, and base our conclusions entirely upon the results of the many experiments which have been made in the last thirty years, we find that their cultivation in wet soils has been attended with the best success and the most remunerative results. It is not to be assumed that they cannot be grown upon soils that are naturally dry, for we have many instances of success under such circumstances, but, as a whole, the upland cultivation has not been equally profitable with the low land. It is not altogether for the purpose of supplying the plants with moisture that abundance of water is required, but for other purposes, among which are the following :

First.—Covering the plants in winter, thereby affording a protection from severe cold.

Second.—Preventing the frost in spring from injuring the flowers.

Third.—Destroying the Cranberry-worms, which sometimes attack the plants and fruit.

Assuming that these precautionary measures are necessary to the best results, it follows that a situation should be selected where the conditions named can be secured.

Another important material, used in preparing Cranberry beds, is sand, which is spread over the surface of the soil.

This not only in a great measure prevents the weeds from growing until the plants have entirely covered the beds, but keeps the fruit clean, besides making the surface always open and friable. Sometimes the low peat beds are so rich in nutritive matter, unless sand is used, that the vines would grow so luxuriant that they would be unproductive.

In fact, very little alluvial soil is needed, and when the deposit is a foot in depth, it will be fully equal, if not superior, to a situation where it is more abundant. In some sections, they are grown in what appears to be almost pure sand, there being scarcely a trace of nutritive matter to be found, the water and the materials held in solution therein, furnishing the principal portions of food to the plants.

The first step in preparing a Cranberry bed is usually that of digging a broad, deep ditch entirely around the plot, for the purpose of draining off the surface water, so that the ground may be cleaned. If the soil thrown out of the ditches is sufficiently compact, it may form the embankments; if not, then other soil must be added. When the water has been removed, then clear off all trees, logs, brush, and other incumbrances; these may be burned on the ground, and the ashes scattered over the surface, provided it can be done without endangering the soil. Sometimes, when the soil is very dry, there is danger of its burn-

ing to considerable depth. Some cultivators remove all of the surface soil to the depth of six inches or a foot, and, in some cases, it may be beneficial for the purpose of bringing the whole bed to a lower grade, but where this is not requisite, and sand is abundant, it is cheaper to spread on a greater depth of sand and leave the whole depth of natural soil.

Again, if the peat is deep enough so that a portion can be spared, it should be carted off for manuring the adjacent land, especially if it is of a sandy nature, for there is no more valuable manure, (barn-yard excepted,) than the top layer of these peat or muck swamps. It is always better to prepare the ground at least one season before planting, so that all weeds, brush, and roots, may be thoroughly destroyed; because if it is not done at the start, it will be a difficult operation after the ground is covered with plants.

Where the soil is sufficiently firm to admit of being plowed and harrowed, it is best to do so, as by this means a more thorough preparation can be obtained, and at less expense than when wholly performed by hand. When the soil has been made level, and otherwise prepared, it should be covered with pure sand to the depth of from four to eight inches, the depth being regulated by the nature of the soil; if it is very loose, then apply more than when comparatively compact, as more or less will sink into the soil below.

A uniform depth is quite important, and can easily be obtained, provided the surface is made level before its application.

The position and texture of the soil will suggest the best mode of application, whether by teams or otherwise.

There are many locations where these peat-beds are underlaid with sand, and if the soil is not over one or two feet deep, and can be sufficiently drained to allow of their being conveniently worked, they may be trenched; bring

ing the required amount of sand to the surface, instead of hauling it from a distance. The sand should be pure, and not mixed with clay, loam, or other soil. All of these circumstances should be taken into consideration when selecting a location for Cranberry plantations.

Often one set of embankments, flood-gates, etc., will answer for several parties, if they can agree and join together in the undertaking. The size of the bed is immaterial; it may be one acre or one hundred, provided it can be made level, so that one portion shall not be covered deeper than another, when flooded. The embankments should be at least four feet high when first made, for they will settle some; besides, it is best to have them a foot or more above high water mark, to guard against breaks.

If one is in no hurry about planting, and is disposed to wait, the embankments may be formed and the ground flooded, and kept in this condition until the weeds, bushes, etc., upon it, are killed, after which the water may be withdrawn, and the preparation of the bed continued as before directed.

COST OF PREPARING THE BEDS.

There can be no reliable estimates given as regards cost of preparing Cranberry beds, inasmuch as no two will be situated exactly alike. It will cost as much to remove the brush, trees, and logs, etc., from one piece of land, as to fully prepare another for the reception of the plants.

The estimates vary from one hundred to six hundred dollars per acre.

A thorough preparation will always be found to be the cheapest in the end.

PLANTING.

The usual time of setting the plants is in the spring, but where the beds can be kept moist, the operation may be continued during the entire summer. Sometimes the plants

are put out late in the fall, and covered with a sufficient depth of water to prevent the ground from freezing and throwing out the plants. The spring and early summer are, however, considered the best time for planting. The plants should be set in rows, from eighteen inches to four feet apart, according to the quantity and quality of plants obtained. The object is to cover the entire surface of the soil with vines, so soon as possible; consequently, the better the plants and the nearer together they are placed, the sooner will this be accomplished. When large plants are to be had, and in sufficient quantities, it is better to place them about two feet apart, each way, than farther, and if the plants do well, they will entirely cover the beds the second season. Most of our larger plantations are made with plants taken directly from the wild beds, and they are removed in large clumps or sods. If there are any weeds or grass among the plants, they should be removed before planting, as they are more readily separated from them at this time than after they are planted.

Small holes are made in which the plants are set, and the soil is then pressed firmly about them. If small plants or cuttings are used, they may be planted nearer together than larger ones.

SELECTION OF PLANTS.

It is important that plants should be obtained from fruitful beds, as well as those which produce the largest and best fruit. There are occasional wild beds that produce little or no fruit; these should be avoided. When plants cannot be obtained near by, from wild or cultivated beds, then they may be bought from those whose business is growing plants for sale. But the purchaser should endeavor to inform himself in regard to the reliability of plant growers before ordering; besides he should give imperative directions that the plants should be carefully taken up and not be allowed to become dry before packing, as

well as that the latter operation should be performed in the best manner. A very little extra expense in packing, or in procuring plants of the best quality, will often be repaid a hundred fold in the first crop. Cranberry plantations are expected to be a permanent investment which shall give annual returns for a lifetime; it therefore becomes very important that every precaution should be taken to make it as perfect as possible.

CULTIVATION.

For the first two or three seasons the beds should be carefully cultivated, and no weeds or sprouts from brush-roots be permitted to grow. The amount of labor required is usually far less than with ordinary farm crops, still a constant attention is necessary, so that the plants shall have the full benefit of the entire soil, and not be obliged to combat with weeds, grass, or other impediments. When the plants have gained possession of the whole surface, there will be very little cultivation required. An occasional sprout or clump of grass may appear, which it will be necessary to remove.

APPLYING WATER.

The water should be let on to the beds at the approach of cold weather, not until the ground begins to freeze, but before it has become frozen hard. The time will vary in different locations, and the cultivator must apply it according to circumstances, and not be guided by set rules as to time. The beds should be covered, so that the water will be deep enough to prevent freezing the plants. At the North, it should be at least two feet deep, while south of the latitude of New York, one foot will ordinarily answer. It should remain upon the beds until the cold weather is past in the spring, when it should be drawn off, leaving it about two inches deep over the surface, until all danger of frost is past.

Where late spring frosts are known to be frequent and severe, it is best to keep on the full depth of water until there is no longer any risk. The longer the water is kept on, the later will the plants bloom.

In some locations the plants are covered for about four or five months in winter, while in others, two or three will be sufficient.

There is no danger of the plants being injured by the water so long as it remains cool, and the later it is kept on, the less the danger of spring frosts injuring the flowers. Sometimes it is beneficial to flow the beds in summer at time of drouth, but in such cases it is only necessary to apply sufficient to give the soil a good soaking. If the water is admitted into the ditches which surround the beds, (if they are not too large,) it will be sufficient to prevent injury from drouth.

GATHERING.

Formerly the berries were gathered with an instrument called a Cranberry rake, but of late years this method has been almost entirely abandoned, and hand picking has taken its place. When gathered by hand, the fruit is not apt to be crushed, besides a far less amount of dirt and leaves are mixed with them; consequently hand-picked fruit will bring a much higher price than any other. Various kinds of baskets, crates, hurdles, &c., are used in gathering the fruit; the main object being to allow all foreign materials, gathered with it, to fall through when being carried in the field, or when spread out to dry. All unsound berries should be carefully picked out before the fruit is packed for market.

VARIETIES.

Like other fruits, the Cranberry varies considerably in its wild state; besides, when cultivated, new variations are constantly occurring. All the varieties in cultivation at

the present time in this country, belong to one species, the *V. macrocarpon*. These vary in size, from a half inch up to an inch or over in diameter. Fig. 100 shows a variety



Fig. 100.—CHERRY CRANBERRY.

usually called the Cherry Cranberry, and fig. 101, one of the largest of the Bell variety. Fig. 102 illustrates the Bell form, and in fig. 103 we give an exact representation of some remarkably fine specimens, raised by Mr. Orrin C. Cook, of South Milford, Mass. There are many other shapes intermediate between these, but we have given the principal ones.

In color, the varieties vary from a greenish-yellow or white to dark, rich purple. New varieties are being produced, and, doubtless, in a few years, great improvements will be made in the size, if not in the quality, of the Cranberry.

INSECTS.

There appear to be two kinds of worms which infest the Cranberry. One of these attacks the young fruit, and the other the plants. The first is described as a small

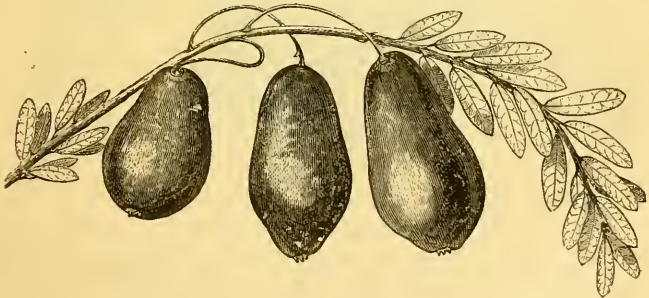


Fig. 101.—BUGLE CRANBERRY.

worm about half an inch in length, with a black head; the other is about the same length, with a red head.

Although it is said that these worms are very destruc-

tive in some sections of the country, there appears to be no definite information as to their origin, period of life, or what kind of insect produces the eggs from which they are hatched. These worms are more destructive in beds that are not flooded than elsewhere. Whenever the plants and fruit are attacked, the water should be let on to the beds and allowed to remain for six to twenty-four hours; this would doubtless destroy the worms without materially injuring the plants.



Fig. 102.—BELL CRANBERRY.

The ravages of the Cranberry worms have not been very extensive, nor very wide spread, and, although I have visited many hundreds of acres of Cranberry beds, I have not as yet seen one of these worms; neither have I been able to find a description of them, or their scientific names, in any work on entomology. It is to be hoped that for the

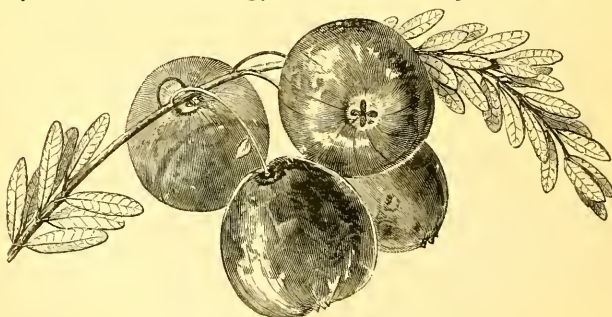


Fig. 103.—LARGE CRANBERRY.

sake of science, some one who has an opportunity will investigate this subject, and give us the results.

UPLAND CULTURE.

Although the cultivation of the Cranberry upon dry upland cannot be recommended as equal to lowland cultiva-

tion, still it possesses so much that is interesting and advantageous that it deserves the attention of those who have no other means of growing them. Even a partial success will very often be highly remunerative, besides affording much pleasure to the cultivator.

There are but few gardens or soils where the experiment is not worth trying on a small scale, even if it is not successful, because the expense is so slight that a total failure would be no great loss of capital.

A light sandy or loamy soil, one that is naturally moist, should be selected, if convenient, and prepared as thoroughly as for a vegetable garden. If swamp-mud or peat can be had, it is well to give a liberal dressing, mixing it with the soil; rake all level, and then plant in rows about two feet apart, and one foot apart in the rows. Hoe the plants as long as it can be conveniently done without disturbing them, after which no cultivation is required, except to pull out large weeds or grass that may occasionally appear.

If saw-dust can be had, it should be applied as a mulch, scattering a light dressing in among the plants; this will keep the soil moist and assist in keeping the weeds down. A small plot of three or four rods square will, if they succeed, be sufficient to supply an ordinary family.

In addition to the value of the fruit, the Cranberry is an exceedingly ornamental plant at all times of the season, whether in fruit or flower. The variety known as the Bell Cranberry is generally planted on upland, but it is probable that others, with proper care, will succeed equally as well. There are a few cultivators in the vicinity of New York who grow all of the improved varieties on upland, and claim that they are very successful with them. Judging from the fruit that has been shown by these gentlemen at our horticultural fairs, the berries grow to as large a size, if not in such large quantities, on upland as upon the low. By obtaining seeds from these upland beds, and

by producing new varieties therefrom, plants may be obtained that will be better adapted to dry soils than any previously known. It is certainly worthy of trial, and I would advise all who have leisure and inclination to try the experiment fully and thoroughly.

PROFITS OF CULTURE.

The profits of Cranberry culture, like those from other fruits, depend somewhat upon the amount of care given the beds as well as upon the markets. There is also a liability of failure from unforeseen causes; still the Cranberry may be considered as certain as any other fruit. To make anything like a fair estimate in regard to profits, we are obliged to select from the reports of the various growers throughout the country, and draw our conclusions therefrom. But in many instances these are so vague that we can only approximate to the truth. I have inserted a few of such as I deem reliable, omitting those which appear to be too far above the average:

Mr. Edmund Bagley, of Massachusetts, reports in the *Journal of Commerce*: cost of land, \$12 per acre; cleaning, \$100; vines and setting, \$50; cultivation, \$10 per year. The fourth year, average crop, 300 bushels per acre; worth \$2.50 per bushel.

F. Trowbridge, New Haven, Conn., considers the usual average about 175 to 200 bushels per acre.

Mr. Sullivan Bates says, that on beds that have been carefully prepared, the yield will be from 150 to 400 bushels per acre.

J. H. Baker, of Westport, Mass., reports the average crop about 175 bushels.

Trowbridge and Davis, of Ocean County, N. J., report 10 acres in bearing; crop 1,100 bushels; although the beds were new, and have not arrived at an age at which a full crop could be expected.

At Shamong, N. J., a small bed is reported to have yielded 220 bushels per acre.

W. R. Braddock, of Bedford, N. J., has 100 acres; 20 acres of which yielded, last season, 1866, an average of 100 bushels per acre. The fruit sold for a price which left him \$6,000 over and above all expenses.

The above statements are about a fair average of the various reports received from the proprietors of Cranberry beds in the Eastern States. The price of the fruit varies from \$2.00 to \$6.00 per bushel. It is probable that when the immense beds, which are now being planted, have arrived at full maturity, our markets will be fully supplied, unless some new way of disposing of the fruit is discovered, which it is very likely will be the case.

CHAPTER X.

HUCKLEBERRY.—(FAMILY ERICACEÆ.)

Huckleberries were formerly all included under the genus *Vaccinium*, but botanists now separate them into the genera, *Gaylussacia* and *Vaccinium*. In general appearance they resemble one another, being branching shrubs, with bell-shaped or urn-shaped corollas and 2-parted anthers. The fruit is a 10 to many seeded berry. The *Gaylussacias* differ from the *Vacciniums* in having only one seed in each cell of the fruit, and their foliage is often sprinkled with resinous dots. For our purposes it is convenient to consider them all under one head.

The species best known in the United States as producing edible fruit, are chiefly deciduous shrubs of medium size, blooming in May and June, and ripening their fruit from July to September.

SPECIES.

The number of species of Huckleberry is quite large, and I shall only name a few of the best.

Gaylussacia frondosa. — Blue Dangleberry. — Leaves obovate, oblong, pale glaucous beneath; branches slender, smooth. Fruit dark blue, covered with white bloom, sweet

and edible. Bush grows three to six feet high. Found from New England to Virginia in low grounds.

G. resinosa.—Black Huckleberry.—Leaves oval or oblong, clammy when young; plants quite branching, the young shoots pubescent; fruit black without bloom, with an agreeable flavor; bush, two to three feet high. Common in swamps and low grounds at the North.

Vaccinium Pennsylvanicum.—Dwarf Blueberry.—Leaves oblong, sometimes lanceolate, smooth and shining; branches green, somewhat angled, occasionally warty; bush one to three feet, very prolific; berries blue, ripening early. The fruit of this species is highly prized on account of its earliness, but it is not so agreeable in flavor as some others. Abundant in dry, sandy seasons, from Maryland northward.

V. Canadense.—Canada Blueberry.—Leaves more or less downy, common in low grounds; otherwise similar to the preceding species.

V. corymbosum.—Swamp Blueberry, or High-bush Huckleberry.—Leaves oval or oblong, variable in size and color. Shrubs four to ten feet high, common in low, wet places. Fruit black, covered with bloom, sweet but sprightly; the best Huckleberry; ripens late in the season, August and September.

Fig. 104 shows a small branch, with bunch of fruit of natural size. This species assumes various forms and colors; sometimes the fruit is oval, approaching an oblong, while others are globular or slightly compressed. The Black High-bush Huckleberry, as it is generally called, is quite distinct, the fruit being destitute of bloom and of inferior flavor. It is distinguished by the name of *V. corymbosum*, var. *atrococcum*, by Dr. Gray. There are many other species and varieties growing wild all over the country. There are also foreign species, but none of them superior to those named. I do not think it necessary to enter into any minute details



Fig. 104.—SWAMP HUCKLEBERRY.

of the history or cultivation of this fruit, from the fact that there is nothing connected therewith which would make the subject interesting. The Huckleberry is one of those fruits which have always been neglected; none of our horticultural writers have deemed it worthy of any particular description, and but very few have thought it worthy of mention.

Why this neglect, I am at loss to understand, for the Huckleberry possesses naturally better qualities than even the Currant and Gooseberry.

All of our northern species are perfectly hardy, producing no thorns, (which is such a disagreeable feature with many of our small fruits,) and the plants are generally quite productive.

The berries are more firm than the Raspberry, Blackberry, or Strawberry; consequently, will bear carriage well, and are suitable for market.

Thousands of bushels are annually gathered from the woods and fields, but these sources of supply will not always be available; besides, we should not be content with depending wholly upon nature for either the necessities or the luxuries of life, while a helping hand would not only increase the quantity, but improve the quality.

Those species, which naturally grow upon high, dry soils, will probably be the best for garden culture; still, because a plant is found in its wild state in any particular soil or situation, it does not follow that similar circumstances are always necessary for its best development when under cultivation. If nature invariably located plants under the most favorable conditions for growth, then improvements would be less certain and far more difficult than now. The history of horticulture affords abundant testimony to the fact that many plants succeed far better in soils and locations differing very materially from the one in which nature has placed them, than otherwise.

The Swamp Huckleberry, (*V. corymbosum*.) is some

times found upon high, dry soils, although it grows chiefly in locations where the roots are immersed in water for the greater portion of the year. That it will grow and produce fruit upon high and dry soils, I have proved by experiment.

There is no great difficulty in removing the plants from their native locality to the garden, but our main dependence for improvement should be upon seedlings, because they will always vary more or less from the parent, and by carefully selecting the best improvements, are certain. The seeds are quite small, and require considerable care in sowing.

A good plan is, to crush the berries, and mix them with fine sand; then put them in a box or flower-pot, and bury in the open ground until spring. Prepare a seed-bed, the soil of which should be, at least, half leaf-mould, or peat, from a swamp; the remainder may be any good garden soil. Surround the bed with boards, a foot or more in width, mix the soil thoroughly and rake level, then sow on the sand containing the seeds; then sift over this soil sufficient to cover the seeds, about a quarter of an inch deep, give a good soaking of water and place a screen over the frame. It may be made of lath, coarse cloth, or anything that will partially shade the plants when they come up, but not wholly exclude the light. Keep the soil well watered, applying the water with a watering-pot, or in such a manner that the seeds or plants will not be disturbed. The seedlings may be transplanted when one year old, if they have made a good growth, or remain in the seed-bed for two years. They will usually come into bearing in three to six years, at which time the best should be marked, so that they may be propagated. The inferior kinds may be thrown away, or be reserved for stocks, on which to work the others. Budding and grafting may be employed in propagation, as well as layers, the operation being performed in the usual manner.

CHAPTER XI.

SHEPHERDIA.

FAMILY ELÆAGNACEÆ.

[Named in honor of John Shepherd, formerly curator of the Liverpool Botanic Garden.]

GENERAL CHARACTERS.

Deciduous shrubs, or small trees, with silvery leaves; flowers diœcious, the sterile ones, (fig. 105) having a four-parted calyx, and eight stamens; the fertile flowers, (fig. 106,) have an urn-shaped calyx, enclosing the ovary which becomes a berry-like fruit. Leaves opposite, entire, deciduous; the flowers very small, yellow, borne in the axils of the small branches.

A very small family of plants, and there is but one species of this genus that is worthy of being cultivated for its fruit.



Fig. 105.



Fig. 106.

Shepherdia argentea.—Buffalo Berry; Rabbit Berry; *Grosse de Buffle*, of the French; *Hippophæ argentea*, of Pursh. — Leaves oblong, silvery-white on both sides;

branches rusty dull white, with many small thorn-like branchlets; fruit round, dull red, sprightly acid, agreeable, borne in very compact clusters in the axils of the small branches, as shown in figure 107. Ripens its fruit in early autumn, or late in summer.

Found on the banks of the upper Missouri, and other large rivers of the Northwest. It is seldom seen in cultivation, but it is really deserving of a place in every garden. The plant is quite ornamental, in addition to its edible fruit, which is produced abundantly. The plant is very hardy, and grows quite readily in almost any good soil. The *Shepherdia*, being diœcious, it is therefore necessary to plant one of each sex to obtain fruit; consequently, those who may have occasion to send to the nurseries for plants, should be careful to order at least one of each kind, although if several are to be planted in a group, one staminate plant will be sufficient to fertilize a half dozen or more pistillate plants.

At the present time, the *Shepherdia* is not grown as a market fruit, but the time may come when we shall see it in our markets, and it is more than probable that new and improved varieties will be produced by some of our enterprising fruit growers. The thorn-like character of its small branchlets makes it a suitable plant for ornamental hedges, and very probably it would be equally serviceable as the Buck-thorn and other similar plants, for turning cattle. It is well worthy of trial, and up to the present time I am not aware that it has been subject to disease, or attacked by any insect.

PROPAGATION.

Gather the berries when ripe, crush the pulp, and wash out the seeds; then sow them, or preserve in sand, until the ensuing spring. The best method is, to sow the seeds in drills soon after they are gathered, covering an inch or two deep. Transplant when one year old into



Fig. 107.—FRUIT OF SHEPHERDIA.

nursery rows, placing the plants a foot apart in the row and the rows four feet apart. They will usually bloom the third year from seed, at which time every plant should be examined, and a label attached to each with the word staminate or pistillate, as the case may be, written upon each; common wooden labels, such as used by nurserymen, freshly painted at the time, will remain legible for two or three years. If it is more convenient to have the plants separated than to keep each one labeled, then they may be taken up after the sexes are determined, and each kind placed in a row by itself.

The *Shepherdias* produce very few suckers, but when any appear, they may be taken off and planted separately. Layers root very readily, and plants may be produced in this manner quite rapidly.

It is quite probable that ripe wood cuttings will grow the same as the Currant, but I have never had occasion to try this mode of propagation, because they grow so readily from seed that I have practiced this method in preference to others. Besides, there is always a chance, when growing any kind of fruit from seed, of producing something better than the original, consequently, the very uncertainty becomes fascinating to the true lover of horticulture, and the hope of the thing lightens the otherwise irksomeness of the task.

There is another species of *Shepherdia* found in the Northern States, the fruit of which is very insipid. I copy the description from Gray's Manual of Botany:

Shepherdia Canadensis. — Canadian *Shepherdia*. — "Leaves elliptical or ovate, nearly naked and green above, silvery-downy, and scurfy with rusty scales underneath; fruit yellowish-red; rocky or gravelly banks; Vermont to Wisconsin, and northward. A straggling shrub, three to six feet high; the branchlets, young leaves, yellowish flowers etc., covered with the rusty scales. Fruit insipid."

CHAPTER XII.

PREPARATION FOR GATHERING FRUIT.

To grow a crop of fruit is but the initial step towards the successful termination of the enterprise.

If the fruit is to be sent to market, then crates, baskets, etc., are necessary for gathering and transporting, all of which should be provided in advance of the ripening of the crop. The number of baskets required per acre cannot be given, inasmuch as the product will not be the same in any two seasons, but it is always best to provide enough, for if the supply should fall short in the busy part of the season, it might cause considerable loss.

We will suppose that a grower expects to send a thousand baskets per day to market, during the season, of any particular kind of small fruit, and if he sends them by railroad or steamboat, to a distance of twenty miles or more, he must not expect to have any baskets or crates returned in less time than six to ten days after the time of the first shipment, unless he has better success than usual with fruit growers in this vicinity; consequently he will have to provide six to ten thousand baskets to enable him continue gathering.

Sometimes, owing to the negligence of the commission merchant, no baskets will be returned for two or three

weeks, and a very large extra supply of baskets will be necessary to prevent a corresponding loss.

Ten thousand baskets, with a corresponding number of crates, should be provided, if a thousand baskets are to be picked per day.

To the inexperienced in these matters, this may seem to be an unnecessary outlay, but fruit growers in the Eastern States, at least, have learned that a little, or considerable, extra capital invested in baskets will quite often insure them against great losses.

Any one who has ever looked through the New York markets, soon after the close of the Strawberry season, must have noticed thousands of baskets and crates lying around loose, or being piled up in the streets, where the boys make bonfires of them at night, and thus the property of the fruit grower is often destroyed through the willful neglect of those to whom the fruit was consigned.

Many remedies have been tried to prevent this waste, but none have been entirely successful, unless it be that of sending very cheap baskets and crates, which it is not expected will be returned. Many fruit growers are adopting this give away system, and under some circumstances it is probably the best, but under others it is doubtful if it is the most profitable in the end.

An attractive exterior is a good passport, even in the fruit line, and I know of many instances where fruit put up in handsome baskets, and enclosed in extra finished crates, has sold for almost double the price of that sent to market in an inferior style of crate and basket.

Many instances might be given in which neat, clean packages and carefully selected fruit, have well paid the grower for all his extra trouble and expense in sending it to market. If a man desires to secure a good reputation for the products of his garden and farm, he will see to it that they leave his premises in the best possible order, and be sure to put his name on each crate or other pack-

age. Competition has become so great within the past ten years, that the cultivators of berries are compelled to exercise more care than formerly in selecting both fruit and packages, as buyers are now more critical and particular as they gain experience. The old trays, each holding several quarts of berries, and from which the fruit was measured out to customers, are no longer seen in our markets, except for some hard kinds like the Huckleberry, and even for these this dishing-out system is very objectionable, to say the least. Of late years large quantities of the small fruits come to our northern markets from the South. This is especially the case with Strawberries, for increased facilities in the way of rapid transit by steamboats and railroads, with refrigerators on both, have now made the shipping of perishable fruits possible when it would not have been thought of a score of years ago. The trade in such articles will no doubt increase in years to come, and growers will need new styles of baskets and crates, or those better adapted to the purpose than any now in common use. But whatever kind of package is used, the grower will ever need to exercise great care in gathering and assorting his fruit. If his pickers are not instructed in regard to picking the berries in the best condition to stand the journey, the good may be injured by the poor, for half a dozen over-ripe berries in a basket are very likely to damage the entire lot. Green berries should also be avoided, but a few of these can be better tolerated than those that have become soft and commenced to decay. The topping out of the baskets with a few of the choicest and largest berries is an almost universal practice, and while in the abstract it might be called dishonest, still it is such a universal custom that no one is deceived. It's merely putting the best side out to attract the buyer.

Crates and baskets are in some cases returned free by the railroad and steamboat companies, unless the distance

to market is too great; under such circumstances it is best not to expect it, but rather to ship the fruit in cheap baskets, unless it will bring enough more to pay for packing in a better style.

The tendency of late years is to let the basket or box go with the fruit to the purchaser, and it is really the better plan, because after a box or basket has been once used for berries, it is usually badly stained, and really unfit for further use. There are thousands of men in our cities who will stop at the market or fruit stands, and purchase a few quarts of berries on their way home in the evening, if sold boxes and all, but if required to return the packages, or compelled to furnish some convenient vessel for carrying the fruit, they would pass by without purchasing. For these and other reasons which might be given, the grower will find it for his own inter-

est to use what are termed the gift box or basket whenever possible. The grape growers have, of late years, adopted the free box, and their sales, as a result, have greatly increased, and without lessening their profits.

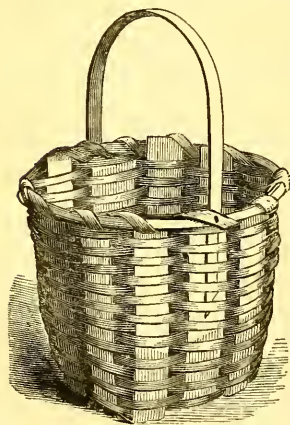


Fig. 108.—JERSEY BASKET.

The most common basket used for the New York market is what is called the Jersey Strawberry basket, figure 108; it requires from five to seven to hold a quart. Of late years this basket is less used than formerly, except

for the smaller varieties of the Strawberry. They are usually made by the fruit growers themselves in winter, but sometimes they are made for sale, and the price varies from ten dollars to fifteen dollars per thousand. A half

dozen of the larger varieties of Strawberries will fill one of these Jersey baskets.

The Raspberry baskets formerly used in New York State, were mainly of this style, but a little larger ; other kinds of baskets are now rapidly coming into use, and it is to be hoped that our small fruits will soon all be sold by measure, and not by the *basket*, regardless of its size, whether it be the size of a thimble, or will hold a half pint or pint, as formerly. .

Baskets or boxes holding a pint or quart, full measure, are most in vogue at the present time, and new patterns are constantly being brought forward, each claiming to be an improvement upon its immediate predecessor.

With most of the small fruits ventilation is requisite to preservation for even a very short time, and this very essential point has not been lost sight of by the manufacturers of most of the new boxes or baskets now before the public.

When fruit is only to be transported a short distance, and will reach the consumer within twelve or fifteen hours after being gathered, ventilation, farther than that which it will receive through an open crate, is not very important, or scarcely necessary.

The idea of ventilation applied to baskets or boxes is a good one, particularly for some kinds of fruit, but there is no necessity of carrying it to extremes, so that the vessels made for holding fruit are scarcely more than fragile wooden nets.

The following are some of the most popular baskets now in use at the East :

American Basket.

This basket is made of two sizes, quarts and pints, and of the form shown in figure 109. They are very strong, of neat appearance, and one of the best baskets with

which I am acquainted. Their peculiar form admits of their being very compactly nested for transportation, as shown in figure 110.

The manufacturers also furnish crates to those who desire them. A thirty-two quart crate is shown in figure 111, each one being furnished with lock

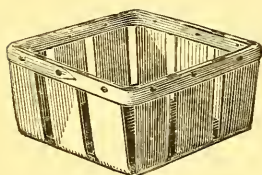


Fig. 109.—AMERICAN BASKET.

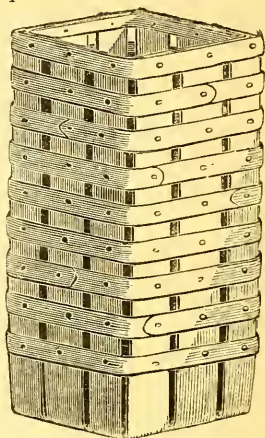


Fig. 110.—STACK OF BASKETS.

attached with a small chain. The fruit grower keeps a key to lock the crate, and the one to whom the fruit is

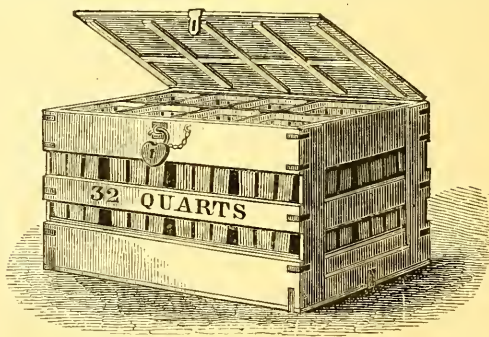


Fig. 111.—CRATE OF AMERICAN BASKETS.

consigned, has a duplicate, with which to open it when received.

Hallock Fruit Box.

A square box, figure 112, made of thin, light wood,

with holes bored in the sides for ventilation, as shown. The bottom is set within the sides, and about three-fourths of an inch above the lower edge, so that when one box is set in the crate above the other, there will be a small space between the fruit of the lower one and the bottom of the one above. This also admits of each box being filled a little more than even full, and still the fruit will not be crushed by the one above it.

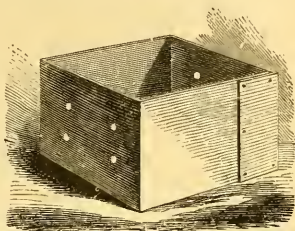


Fig. 112.—HALLOCK FRUIT BOX.

These boxes are used in large quantities at the West, also considerably in some portions of the East. Some fruit growers object to any box or basket with perpendicular sides, because the fruit will settle more in carrying than when the sides slope, as in the American basket. There are advantages in both forms, also disadvantages. A square box, with perpendicular sides, packs and remains more firmly in its place than any other, but ventilation through the sides cannot be obtained, and the fruit will crush more readily than in boxes with sloping sides.

Free Fruit Box.

Figure 113. As its name implies, this box is intended

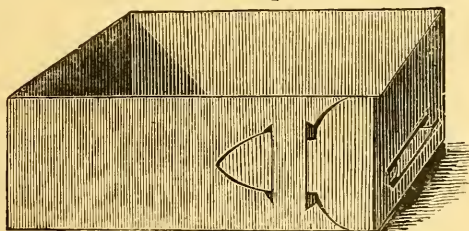


Fig. 113.—FREE FRUIT BOX.

to be given away with the fruit. This will be quite convenient for those who forget to take a basket with them

in the morning when going to business, and thereby have a very plausible excuse for not bringing home some fruit for tea. This box was invented for the purpose of relieving fruit growers of one of the most annoying incidents of sending their fruit a long distance to market—the necessity of having their crates and boxes returned to them. It supplies a want which has always existed in the berry trade, and will be sold so cheap that it can be given away with the fruit. In appearance, it is remarkably neat, light, but substantial, while the fruit will always go to market in a perfectly clean box. Though given away, it will save the grower money, enable him to get a better price for his fruit, and put an end to the annual loss of boxes, besides saving him the necessity of keeping a vast quantity of the boxes and crates on hand to provide for the delay of returning them.

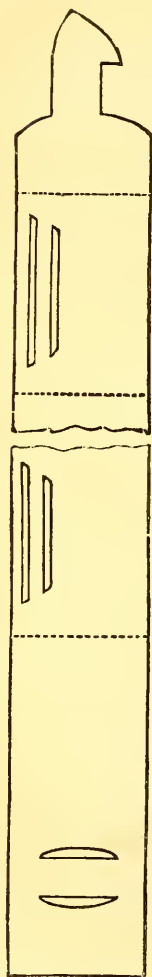


Fig. 114.—SIDE OF
FRUIT BOX.

The box is composed of two pieces of veneer. Figure 114 represents a piece which is folded up into four sides of the box. It is scored or cut at the dotted lines, so that it can be folded up into a shell as readily as a piece of paste-board. The tongue, at the left-hand end, buckles into the two slots at the right-hand end, just like closing a pocket book. A notch on the end of the tongue catches so effectually, after being buckled in, as to hold the shell firmly together.

The bottom is shown in figure 115. The two tongues at the end are also

scored or cut at the dotted lines, and being readily turned up, are buckled into the two sets of slots shown on the left-hand edge of figure 114. When thus buckled to-

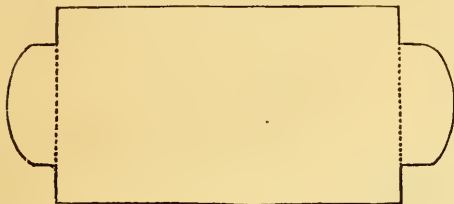


Fig. 115.—BOTTOM OF BOX.

gether, the two pieces form a perfect box, as seen in figure 113, neither nails nor glue being required, and the whole

constituting a strong and beautiful box. The bottom cannot fall out, as it is firmly held in its place by the spring of the wood. The prominent advantages secured by the use of this box are as follows :

1. The great desideratum of a box always nice and cleanly is, for the first time, secured.

2. The commission agent being relieved from the great annoyance of hunting up and returning crates and boxes, as well as escaping the loss of them, will sell the fruit for much less than the usual commission.

3. The return freight of empty boxes is saved, and this, added to the saving in commission, will more than pay for the cost of crates and boxes.

4. Another saving is secured in sending to market, as one hundred of the Free boxes, quart measures, weigh only nine and one-third pounds, while one hundred of the old square quarts weigh fifty pounds. As fruit in crates goes to market by weight, the new box saves eighty per cent of the weight. Any one can readily satisfy himself by a calculation of what is thus saved in freight to market, commission, and return of empty crate, that he will really save money by using a box that he can give away. It will be found cheaper to use a box only once than to continue using it many times.

5. As these boxes are put together without nails or

glue, they can be sent to distant growers, in the shape of flats, to be made up by children at odd times during the winter. The flats are scored ready for folding up, and as the wood bends at the joint without breaking, a small

girl will learn in five minutes how to put them together. Many hundred boxes thus packed as flats can be got into a small compass, and at trifling cost of freight."

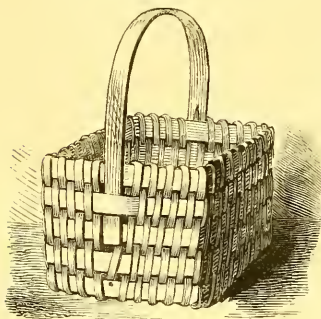


Fig. 116.—SQUARE CHIP BASKET.

Square Chip Basket.

Figure 116. Here we have an improvement on the common Jersey basket. The

slats are reversed, the wide one passing around the basket, and the small ones forming the uprights, thereby giving a comparatively smooth surface, allowing the baskets to be lifted out or put back into place in the crates, without catching upon those adjoining, and upsetting them, as is often the case with the common one. These baskets are made square, consequently packed very closely together, leaving no vacant spaces between them. An excellent basket for Raspberries.

Gothic Free Fruit Box.

This box is intended to be given away with the fruit. They are of an octagon shape, as shown in figure 117, made of veneer, and can be sent in flats and put together by the fruit grower, thus saving much expense in transportation. The material, all ready to be put together, costs ten dollars per thousand.

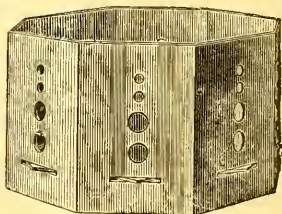


Fig. 117.—GOTHIC FREE FRUIT BOX.

Cook's Basket.

This is a very neat and pretty basket, very strong and durable. Some of our fruit growers object to it on account of the small strips of which it is made, because, as the berries settle, they are injured, by being cut by the sharp edges. It is, however, an excellent basket, but probably on account of its cost is seldom, of late years, seen in our markets.

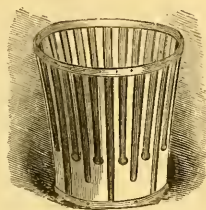


Fig. 118.—COOK'S BASKET.

The Paragon Basket.

Figure 119. Another neat, light box, of more recent introduction than the above, and much liked by the commission men. Three strips of thin whitewood form the bottom and sides of the basket; the bottom hoop is dis-

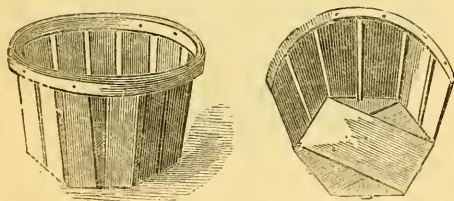


Fig. 119.—PARAGON BASKET.

pensed with, as well as the extra bottom piece. There is ample provision for ventilation, and the shape of the top is round, thus enabling the fruit to show at its best.

Belgian Strawberry Basket.

This basket, figure 120, would probably not suit our American way of doing things, and is merely introduced to show "how they do it in Belgium." A correspondent of the "American Agriculturist," from which the ac-

companying illustration is taken, writes : “ In travelling through Belgium, in June, Strawberries are brought to the car windows at every station—luscious, great berries, some red, some white, often as large as a pullet’s egg, and temptingly displayed in shallow baskets, made of split willow, in the form given in the engraving. The construction is simple, strong, and inexpensive. A single willow withe forms the handle and middle support of the



Fig. 120.—BELGIAN STRAWBERRY BASKET.

bottom ; a second withe, bent to a circle, forms the rim ; and four others, *i. e.*, two on either side, between the middle piece and rim, complete the foundation into which thin strips are braided. The depth is only a quarter inch, diameter three inches. On the bottom are a few fresh grape leaves, on which are placed the berries, nearly all exposed to view.”

Guernsey Fruit Box.

This is a round box, figure 121, made of thin veneer and reversible, as either end may be used as the cover,

there being a thin band within which holds both ends together. This box would answer better for Currants and Gooseberries, than for Raspberries and similar fruit, as it

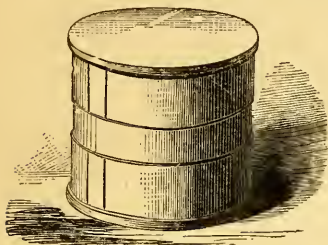


Fig. 121.—GUERNSEY BOX.

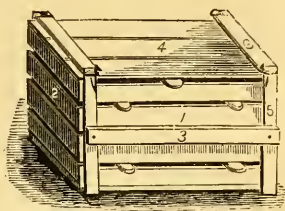


Fig. 122.—JOHNSTON'S CASE.

is not ventilated ; but ventilation might be given by boring holes through one end.

Johnston's Premium Fruit Case

Is made up of four trays seventeen inches wide, twenty-three inches long, and three inches deep, holding a little over one half bushel ; side pieces, 1, in figure 122, half inch thick, three inches wide, twenty-three inches long ; ends, 2, three-eighths of an inch thick, three inches wide, and nineteen and a half inches long ; bottoms of three upper trays half inch thick ; standards, 5, two inches by three-quarters by fifteen ; cover cleats, 6, two inches by three-quarters by eighteen ; tops, 4, twenty-four inches by six by three-eighths ; handles, 2, twenty-three inches by two by five-eighths ; bottoms of case twenty-four inches by six by half ; the bottom tray is made of heavier stuff, sides, 4, in figure 123, five-eighths of an inch thick, end one and a half inch thick and sides are let into the ends, as seen in 1 ; this tends to strengthen the standard, 2, which is firmly nailed to both side and end pieces. The trays are separated by slats three-eighths of an

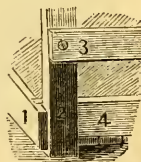


Fig. 123.

inch by two inches, with the ends projecting about half an inch, as seen in figure 122. The cover has also a narrow slat at each end. The cover is fastened by bending a piece of hoop iron around the standard, and fastening it to both sides of the cover cleats with screws, and a spring made of the same is attached to the inside edge of the standard, runs up through, and hooks over the band of hoop iron, the standard being sawed out to admit of working the spring, as seen in figure 122.

Care should be taken to make the trays all square, and the covers all alike, so that each will fit in any case. In order to have the standards all alike, the handles should not be put on until after the covers are. In getting out a bill of material, have it sawed in planks at the saw mill, as thick as you want the pieces wide, and have it worked up by circular saw.

I am not aware that this style of case is in use at the East, but it is a western invention, and used by growers in that section.

Smith's Grape Box.

Though made with reference to packing grapes, this

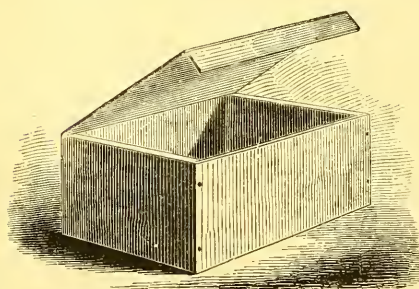


Fig. 124.—SMITH'S GRAPE BOX.

box will answer for Currants, Gooseberries, and those fruits that do not especially need ventilation. The sides of this box are made of veneer, cut partly through at the edges where it bends over the

end pieces, which are thick enough to allow the sides to be nailed to them. The cover fastens down by tacking

the flap to the ends. They are made with the sides, top, and bottom, all in one piece, as shown in figure 124, or with these in two pieces, so that it is reversible and may be opened at either top or bottom.

New styles of baskets are being brought out every season, but they can scarcely be called improvements upon the old ones.

GATHERING FRUIT.

In sections where the small fruits are grown extensively, women and children are chiefly employed to gather them, being paid so much per basket.

The small Jersey Strawberries are generally pulled, as it is called, or separated from the calyx, or hull, when picked; with the larger kinds it is left on. The price paid for picking varies from seventy-five cents to one dollar twenty-five cents per hundred for the small baskets, and three to five cents per quart for the larger Strawberries, Raspberries, and Blackberries. At these prices, an expert hand will make two to three dollars per day where the fruit is abundant.

The fruit should always be gathered in dry weather, and none should be picked in the morning while the dew is on.

The usual method practised in the larger plantations is something like the following:

A tent or temporary shed is erected in or near the field in which the fruit is grown, and the superintendent remains in this and takes charge of the fruit as it is brought in, giving each picker a ticket, stating the number of baskets brought in. When one or two hundred baskets are gathered, then the small tickets are taken up and a large one given, on which is printed good for one, two, or more dollars, as the case may be. These tickets are redeemed at the end of the week, provided the holder retains them until that time; but with some a week is a very long

time to keep a promise to pay, and they sell them. In some portions of New Jersey, and perhaps elsewhere, these tickets pass current at the stores in the vicinity, and the merchants take them in exchange for goods, and when the season is over, present them to the proper persons for redemption.

At the time of gathering, each picker is furnished with a stand (figure 125), holding ten to twenty-five

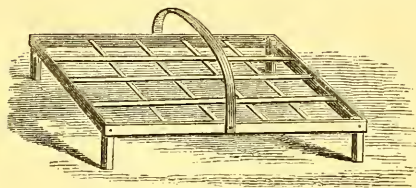


Fig. 125.—BASKET STAND.

baskets. When all are filled, they are carried to the tent and put into the crates, ready for sending to market. The small Jersey baskets are

put into crates holding from one hundred and fifty to two hundred each, but when pint and quart baskets are used, from thirty to sixty go in a crate.

The pickers have to conform to certain rules promulgated by the nabob of the tent, for there must be discipline and system observed in fruit gathering, as in every other business, to produce the best result. No picker must be allowed to encroach upon his neighbor, and when a row or bed is selected at the start, it must be retained until all the fruit for that time is gathered. The next bed or row must be taken by lot—and no dodging because it happens to be a poor one.

The time of the vintage is one of rejoicing in the vine countries of Europe, and equally so is the time of gathering the small fruits in America. Good feelings prevail on all sides, and particularly if the crop is abundant, for both employer and the employed are abundantly rewarded for their labor.

TABLE OF DISTANCES.

To show at a glance the number of hills or plants contained in an acre of land, at any given distance from each other, from 40 feet by 40, to 1 foot by 1, omitting fractions. Divide the amount by 160, will show the No. for 1 rod.

| feet | feet | per acre | feet | feet | per acre | feet | feet | per acre | feet | feet | per acre |
|------|-------|----------|------|--------|----------|------|--------|----------|------|--------|----------|
| 40 | by 40 | 27 | 11 | by 5 | 792 | 5 6 | by 1 6 | 5280 | 3 3 | by 3 0 | 4818 |
| 39 | .. 39 | 28 | 10 | .. 10 | 435 | — | .. 1 0 | 7920 | — | .. 2 9 | 4882 |
| 38 | .. 38 | 30 | — | .. 8 | 544 | 5 0 | .. 5 0 | 1742 | — | .. 2 6 | 5361 |
| 37 | .. 37 | 31 | — | .. 6 | 726 | — | .. 4 6 | 1936 | — | .. 2 3 | 5956 |
| 36 | .. 36 | 33 | — | .. 5 | 871 | — | .. 4 0 | 2178 | — | .. 2 0 | 6701 |
| 35 | .. 35 | 35 | — | .. 4 | 1089 | — | .. 3 0 | 2904 | — | .. 1 9 | 7658 |
| 34 | .. 34 | 37 | — | .. 3 | 1452 | — | .. 2 6 | 3484 | — | .. 1 6 | 8935 |
| 33 | .. 33 | 40 | — | .. 2 | 2178 | — | .. 2 0 | 4356 | — | .. 1 3 | 10722 |
| 32 | .. 32 | 42 | — | .. 1 | 4356 | — | .. 1 6 | 5808 | — | .. 1 0 | 13403 |
| 31 | .. 31 | 45 | 9 | .. 9 | 537 | — | .. 1 0 | 8712 | 3 0 | .. 3 0 | 4840 |
| 30 | .. 30 | 48 | — | .. 8 | 605 | 4 6 | .. 4 6 | 2151 | — | .. 2 9 | 5289 |
| 29 | .. 29 | 51 | — | .. 6 | 806 | — | .. 4 0 | 2420 | — | .. 2 6 | 5808 |
| 28 | .. 28 | 55 | — | .. 5 | 968 | — | .. 3 6 | 2765 | — | .. 2 3 | 6453 |
| 27 | .. 27 | 59 | — | .. 4 | 1210 | — | .. 3 0 | 3226 | — | .. 2 0 | 7260 |
| 26 | .. 26 | 64 | — | .. 3 | 1613 | — | .. 2 6 | 3872 | — | .. 1 9 | 8297 |
| 25 | .. 25 | 69 | — | .. 2 | 2420 | — | .. 2 0 | 4840 | — | .. 1 6 | 9680 |
| 24 | .. 24 | 75 | — | .. 1 | 4840 | — | .. 1 6 | 6453 | — | .. 1 3 | 11616 |
| 23 | .. 23 | 82 | 8 | .. 8 | 680 | — | .. 1 0 | 9680 | — | .. 1 0 | 14520 |
| 22 | .. 22 | 90 | — | .. 6 | 905 | 4 0 | .. 4 0 | 2722 | 2 9 | .. 2 9 | 5760 |
| 21 | .. 21 | 98 | — | .. 5 | 1089 | — | .. 3 9 | 2904 | — | .. 2 6 | 6336 |
| 20 | .. 20 | 108 | — | .. 4 | 1361 | — | .. 3 6 | 3111 | — | .. 2 3 | 7040 |
| — | .. 15 | 145 | — | .. 3 | 1815 | — | .. 3 3 | 3350 | — | .. 2 0 | 7920 |
| — | .. 10 | 217 | — | .. 2 | 1722 | — | .. 3 0 | 3630 | — | .. 1 9 | 9051 |
| — | .. 5 | 435 | — | .. 1 | 5445 | — | .. 2 6 | 4356 | — | .. 1 6 | 10560 |
| 19 | .. 19 | 120 | 7 | .. 7 0 | 888 | — | .. 2 3 | 4840 | — | .. 1 3 | 12672 |
| — | .. 15 | 162 | — | .. 6 6 | 957 | — | .. 2 0 | 5445 | — | .. 1 0 | 15840 |
| — | .. 10 | 229 | — | .. 6 0 | 1037 | — | .. 1 9 | 6222 | 2 6 | .. 2 6 | 6969 |
| — | .. 5 | 453 | — | .. 5 0 | 1244 | — | .. 1 6 | 7260 | — | .. 2 3 | 7740 |
| 18 | .. 18 | 134 | — | .. 4 6 | 1382 | — | .. 1 3 | 8712 | — | .. 3 0 | 8712 |
| — | .. 15 | 161 | — | .. 4 0 | 1555 | — | .. 1 0 | 10890 | — | .. 1 9 | 9250 |
| — | .. 10 | 242 | — | .. 3 6 | 1777 | 3 9 | .. 3 9 | 3097 | — | .. 1 6 | 11616 |
| — | .. 5 | 484 | — | .. 3 0 | 2074 | — | .. 3 6 | 3318 | — | .. 1 3 | 13039 |
| 17 | .. 17 | 150 | — | .. 2 6 | 2489 | — | .. 3 3 | 3574 | — | .. 1 0 | 17424 |
| — | .. 15 | 170 | — | .. 2 0 | 3111 | — | .. 3 0 | 3872 | 2 3 | .. 2 3 | 8604 |
| — | .. 10 | 256 | — | .. 1 6 | 4148 | 3 9 | .. 2 9 | 4224 | — | .. 2 0 | 9680 |
| — | .. 5 | 512 | — | .. 1 0 | 6222 | — | .. 2 6 | 4646 | — | .. 1 9 | 11062 |
| 16 | .. 16 | 170 | 6 | .. 6 0 | 1210 | — | .. 2 3 | 5162 | — | .. 1 6 | 12906 |
| — | .. 15 | 175 | — | .. 5 6 | 1320 | — | .. 2 0 | 5808 | — | .. 1 3 | 15488 |
| — | .. 10 | 272 | — | .. 5 0 | 1452 | — | .. 1 9 | 6637 | — | .. 1 0 | 19260 |
| — | .. 5 | 544 | — | .. 4 6 | 1613 | — | .. 1 6 | 7744 | 2 0 | .. 2 0 | 10890 |
| 15 | .. 15 | 193 | — | .. 4 0 | 1815 | — | .. 1 3 | 9272 | — | .. 1 9 | 12445 |
| — | .. 10 | 290 | — | .. 3 6 | 2074 | — | .. 1 0 | 11616 | — | .. 1 6 | 14520 |
| — | .. 5 | 580 | — | .. 3 0 | 2420 | 3 6 | .. 3 6 | 3535 | — | .. 1 3 | 17424 |
| 14 | .. 14 | 222 | — | .. 2 6 | 2904 | — | .. 3 3 | 3829 | — | .. 1 0 | 21780 |
| — | .. 10 | 311 | — | .. 2 0 | 3630 | — | .. 3 0 | 4148 | 1 9 | .. 1 9 | 14223 |
| — | .. 5 | 622 | — | .. 1 6 | 4840 | — | .. 2 9 | 4525 | — | .. 1 6 | 16594 |
| 13 | .. 13 | 257 | — | .. 1 0 | 7260 | — | .. 2 6 | 4973 | — | .. 1 3 | 19913 |
| — | .. 10 | 335 | 5 6 | .. 5 6 | 1417 | — | .. 2 3 | 5531 | — | .. 1 0 | 24454 |
| — | .. 5 | 670 | — | .. 5 0 | 1584 | — | .. 2 0 | 6222 | 1 6 | .. 1 6 | 19360 |
| 12 | .. 12 | 302 | — | .. 4 6 | 1760 | — | .. 1 9 | 7111 | — | .. 1 3 | 23232 |
| — | .. 10 | 363 | — | .. 4 0 | 1980 | — | .. 1 6 | 8297 | — | .. 1 0 | 29040 |
| — | .. 5 | 720 | — | .. 3 6 | 2262 | — | .. 1 3 | 9556 | 1 3 | .. 1 3 | 27878 |
| 11 | .. 11 | 360 | — | .. 3 0 | 2640 | — | .. 1 0 | 12445 | — | .. 1 0 | 34848 |
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